Education Marginalization in Sub-Saharan Africa

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Reaching the marginalized

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1. Introduction

In the framework of Education for All, both aspects of education, quantity (enrolment) and quality (achievement) need to be considered simultaneously. Since considerable improvements have been made over the last decade with respect to quantity, quality increasingly becomes the major issue of concern. Especially with respect to educational marginalization, i.e. situations of acute and persistent disadvantage in education (UNESCO 2010), this aspect appears to be highly relevant. As enrolment rates converge to full enrolment, at least at primary level, formerly marginalized groups are no more excluded from schools. But does this end their marginalization? They might attend school, but be strongly disadvantaged through the general lack of educational resources which they cannot privately compensate for, or through selection into educational institutions of minor quality. The latter may in turn be related to regional differences in the quality of schools or to the self-selection of good teachers into more prestigious schools with students of higher socio-economic background.

In this paper, we will use the two major international student data bases available for Africa. They are based on surveys carried out by the Southern and Eastern African Consortium for the Monitoring of Education Quality (SACMEQ) and the Programme d'Analyse des Systèmes Educatifs de la CONFEMEN[1] (PASEC). The data contains information on test scores as well as on student, teacher and school background which is comparable at least within each of the country groups covered by the two organizations. These country groups are, broadly speaking: francophone Africa (PASEC), and Anglophone Africa (SACMEQ). As the information available in the two datasets is not strictly identical, we will not always be able to assess exactly the same question for all countries, but wherever this is possible, we try to provide a comprehensive picture for as many countries as possible.

We will start this paper with some more detailed information on the two datasets (Section 2). We will then proceed by an assessment of the extent to which parts of the student population, which one would generally tend to regard as potentially disadvantaged due to their socio-economic background or their geographic location (e.g. isolated rural area) may be marginalized in terms of educational achievement. For some countries, we can compare their scores for two subsequent survey periods to see whether there are differences over time with respect to the inclusiveness of the education system. Moreover, an explorative analysis will show, at least for francophone countries, whether certain language groups within the student population must be considered as particularly disadvantaged (Section 3).

In Section 4, we will continue our descriptive statistical analysis by starting from a definition of the educationally marginalized as those students within the lowest decile of achievement scores and assess their general characteristics relative to students in the middle of the performance distribution.

In Section 5, we proceed with a multivariate analysis which allows us to estimate the effect of a combination of disadvantaging factors. The multivariate analysis also allows us to assess, to which extent the learning difficulties faced by students with unfavorable characteristics have a direct effect on achievement, or rather an indirect

[1] CONFEMEN: Conférence des Ministres de l'éducation des pays ayant le français en partage.

one through the attendance of worse performing schools or through being taught by less skilled teachers.

Finally, this analysis will allow us to draw some conclusions, regarding both, educational, performance related marginalization in general, and policy measures that may be appropriate to foster inclusiveness (Section 6).

2. Data

The SACMEQ data base includes more than 40.000 sixth grade students from 13 countries: Botswana, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania (main land and Zanzibar are treated like two distinct countries), Uganda and Zambia. The PASEC data used here includes about 20.000 fifth grade students and the same number of second grade students from eight countries: Burkina Faso, Cameroon, Côte d'Ivoire, Madagascar, Mali, Niger, Senegal and Togo. All initial surveys were carried out between 1995/1996 and 2001/2002. In addition, for Cameroon and Madagascar, we make use of a second round of surveys from 2005. In Senegal, students have been followed from grade 1 to 6 through regular assessments, so that we can obtain additional information on the dynamics of marginalization (see Annex 7 for an overview of all surveys considered in this study).

For both sets of countries, the data includes test scores for literacy (in French and English respectively) and mathematics, in addition to a high number of variables relating to the student, teacher and school characteristics. For SACMEC, test scores (within a given subject) were made comparable across countries through the use of a common scale (international mean score: 500, standard deviation: 100). For PASEC the scores are expressed as the percentage of correct answers (international mean score: 48, standard deviation: 22)[2], but comparable as well through the use of a common test (for each subject and grade). Data have been scaled, however, for the panel in Senegal, where this was unavoidable to compare achievement over time.[3] In this particular context, the mean score is 0, and the standard deviation is 1. For a general overview over the distribution of scores in the individual countries (including only grade 2 of panel Senegal), see Annex 1.

For SACMEQ, student weights are provided that allow us to present representative results in our descriptive analysis. PASEC does not provide weights for most of the countries covered, but the surveys are designed in a way to be representative from the outset (CONFEMEN 1999).[4] There are a few exceptions to this rule which relate to the thematically focussed surveys carried out in Mali, Niger and Togo. For this reason, these three countries will only be considered in our multivariate regression analysis.

Moreover, the two datasets differ with respect to the grades covered by the survey. In PASEC, students covered attend 2nd and 5th grade, whereas SACMEQ students are in 6th grade. The assessment of students towards the beginning and towards the end of primary schooling in PASEC allows us to detect potential changes in the importance of certain characteristics of marginalization.

Finally, an important feature of the PASEC dataset is that it always includes a test at the beginning of the school year along with the test at the end of the year. This provides a highly interesting control variable for our multivariate regression analysis,

[2] To be precise, we need to distinguish between the different grades and subjects here. For the data including Mali, Niger and Togo, but excluding the different waves of the panel Senegal and the repeated studies for Cameroon and Madagascar, the corresponding values are:

- 5th grade French: mean 41.7 per cent, standard deviation 18.2 per cent
- 5th grade Mathematics: mean 43.9 per cent, standard deviation 18.2 per cent
- 2nd grade French: mean 52.2 per cent, standard deviation 25.3 per cent
- 2nd grade Mathematics: mean 50.5 per cent, standard deviation 24.3 per cent.

[3] We thank Christian Monseur for having carried out the relevant scaling procedure.

[4] In fact, they are generally representative surveys of schools, but it is not taken into account that the probability of any particular student to be part of the sample also depends on the size of the school.

which allows us to test the effect of characteristics of marginalization not only on the final level of student achievement, but also on its change within a given academic year.

3. Socio-economic, geographical and cultural marginalization

The UNESCO Global Monitoring Report 2009 identifies rural populations and socio-economically disadvantaged groups as those at the highest risk of marginalization, although differences in student achievement across these dimensions appear to be more pronounced in developed than in developing countries (Ma 2008). In addition cultural, ethnic and gender related factors may contribute to marginalization (UNESCO 2009). In the following we will examine to what extent this holds true with respect to student learning. This analysis is obviously conditional on children attending school in the first place, which implies that a first round of possible selection is already taken successfully.

In this initial analysis, we will concentrate on geographical, socio-economic and ethno-cultural factors. Considering the ***geographic factors***, PASEC data allow us to go beyond the simple differentiation between urban and rural areas and to distinguish between four categories, namely students in towns, suburbs, big villages and small villages. Similarly, SACMEQ data differentiate between students in isolated rural areas, rural areas, small towns or large towns.[5] While these categories are not exactly identical, clearly, in both cases, previous evidence would lead us to expect students in isolated rural areas or small villages to be at the highest risk of marginalization.

Figures 3.1 and 3.2 show to what extent achievement of students from these groups does indeed differ from a) the median score, and b) the scores of students of the three other groups within each country.

Overall, results correspond to expectations in that, with few exceptions, we observe a clear rise in scores across the different categories with values being highest for students in (large) towns. However, it seems that at least towards the end of primary education (6th grade SACMEQ and 5th grade PASEC), the differences are rather moderate. Comparing the achievement of students in isolated rural areas or small villages to median achievement usually results in a difference of less than one third of the (international) standard deviation.[6] The achievement difference between students attending school in isolated rural areas and the geographically most advantaged students in large towns is, of course, larger, sometimes substantially so. The reason for this, however, tends to be the much more favorable situation of students in large towns rather than the particular disadvantage of students in isolated rural areas (Namibia, South Africa).

A striking exception is the case of Mauritius where the mean score of students in isolated rural areas is almost a full international standard deviation below the country median. However, most students from the categories ‘isolated’ and ‘rural’ are from the much smaller island of Rodrigues which, at a 400 km distance from the main island, still belongs to the Mauritian territory (Kulpoo and Soonarane 2005). Apparently, in this particular case, geographic isolation does indeed imply educational marginalization.

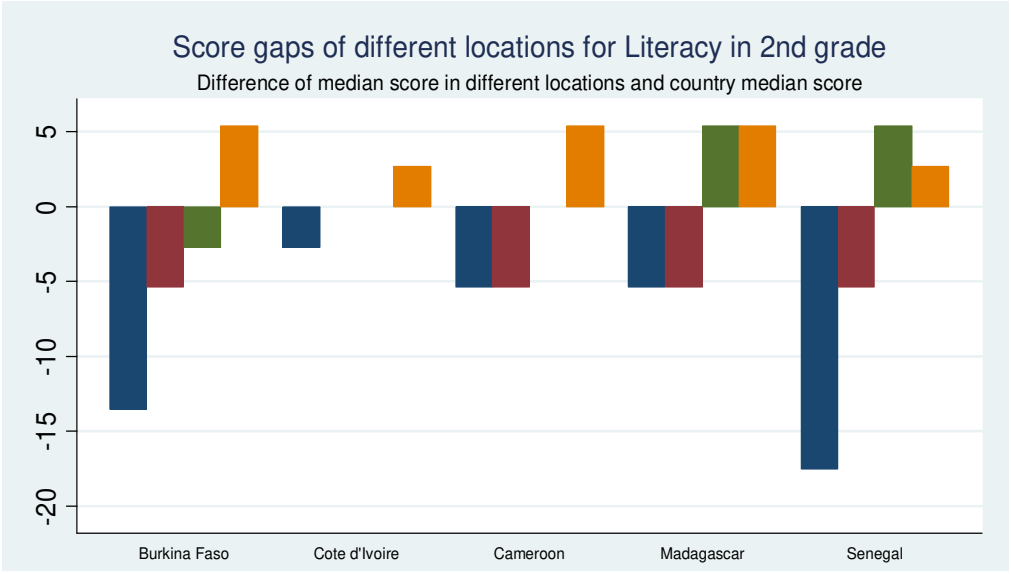
Apart from examining the situation across countries, PASEC data allows us to compare students towards the beginning and towards the end of primary education. Under the assumption that distributional differences between scores at grades 2 and 5 are not simply an artifact of differences in the discriminatory power of the different tests, we can make several interesting observations. While students in isolated rural areas or small villages do not obtain scores substantially below the country median in

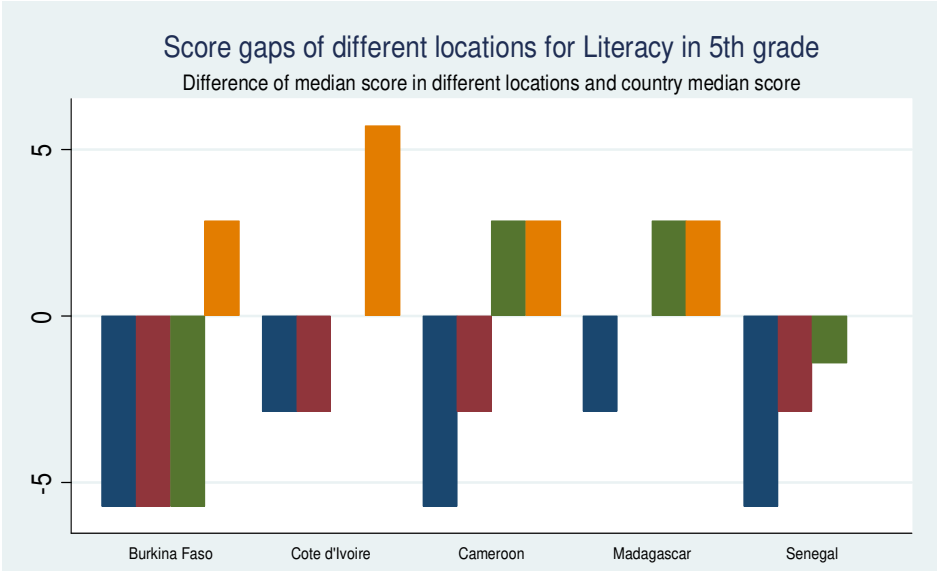
[5] The information on the location of the school is collected by the director questionnaires and is therefore to some extent subjective.

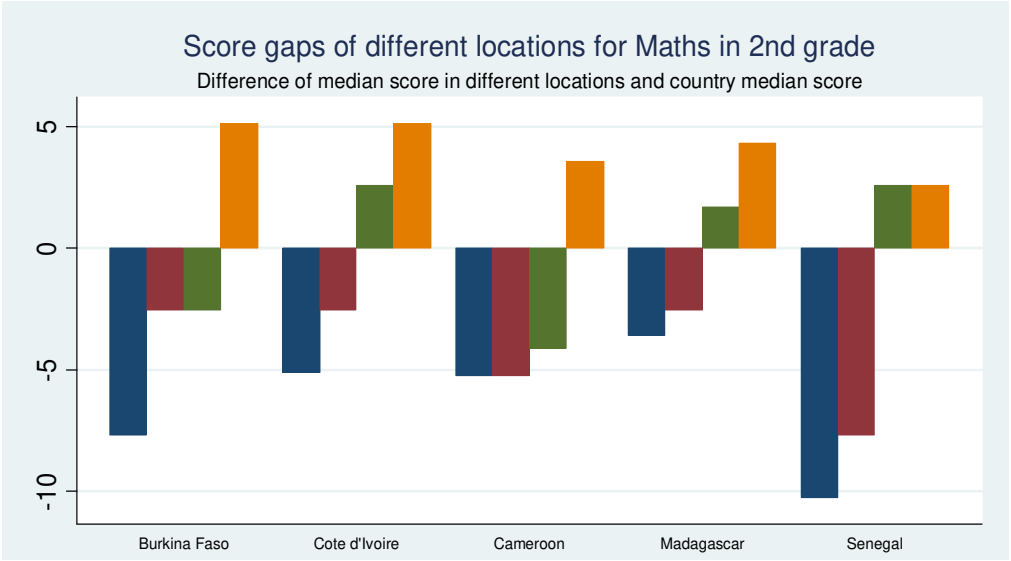
6 For the sizes of the sub-samples, see Annex 5, Table A5.7.

Figure 3.1: Geographical location and scores, PASEC, by country, subject and grade

Note: Data for Madagascar and Cameroon is pooled over both waves of data collection (for changes over time see Annex 2.)







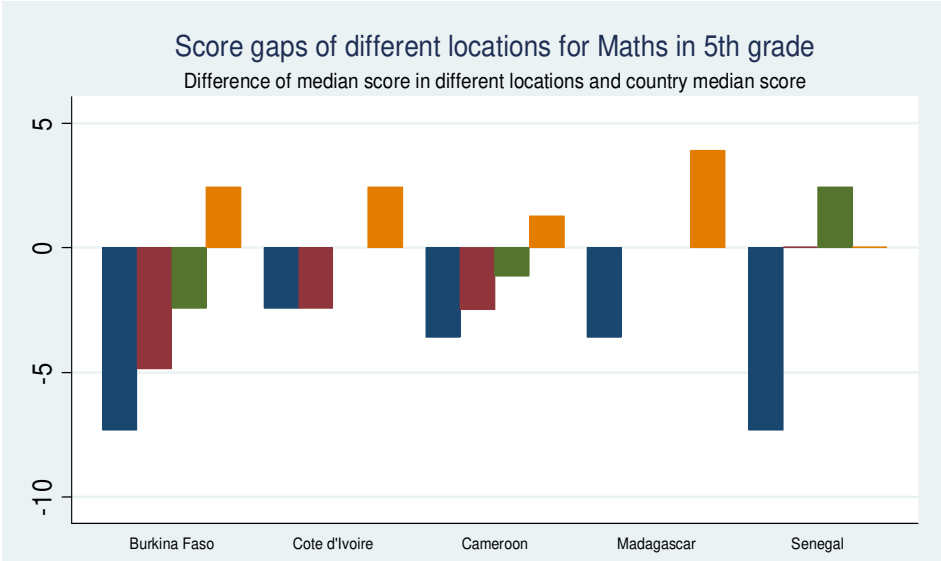
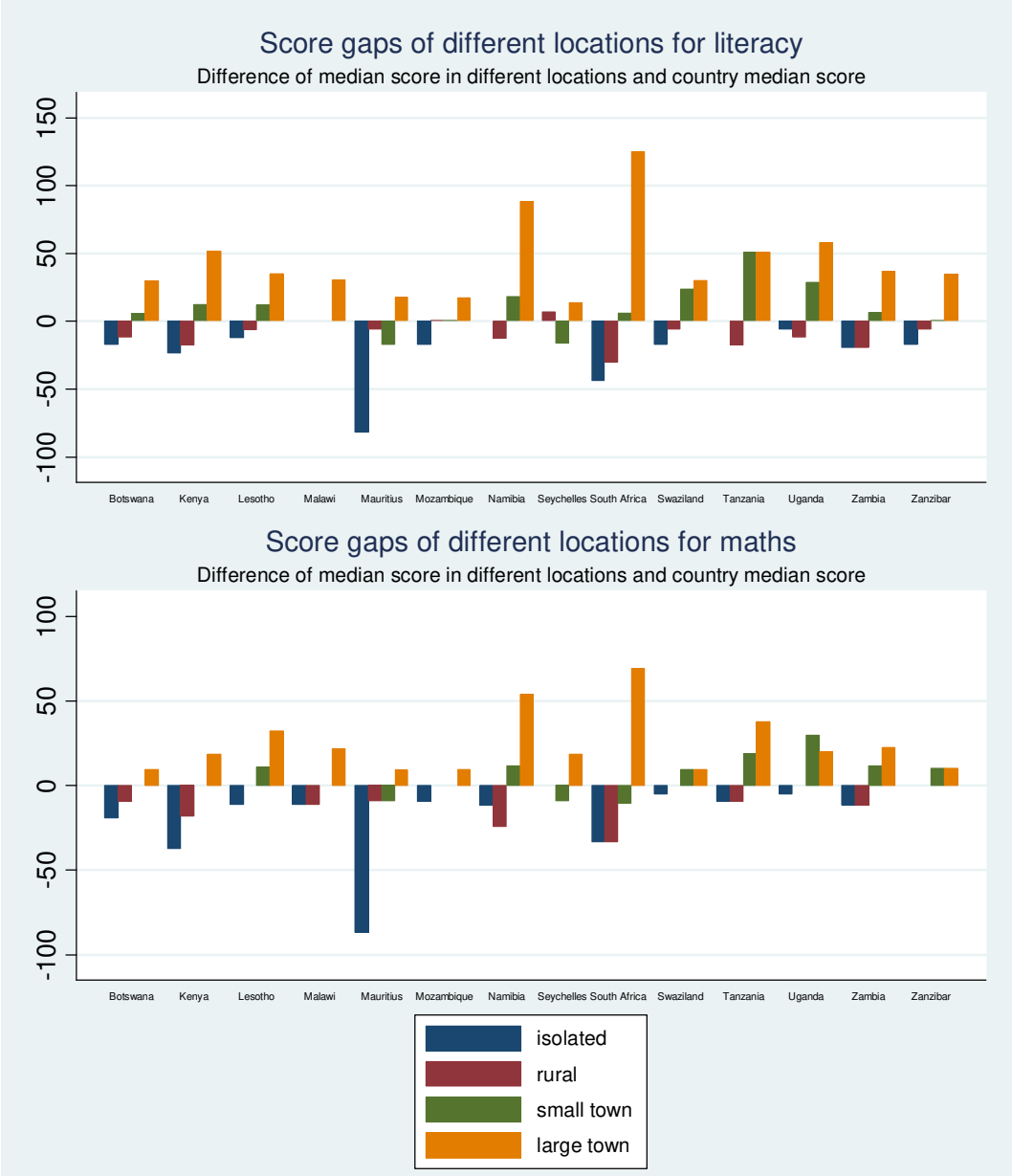


Figure 3.2: Geographical location and scores, SACMEQ, by country and subject



grade 5, the situation is different in grade 2, especially for literacy. As, during the initial years of primary education, students from remote areas tend to struggle significantly with French (or English) as the language of instruction, this result does not come unexpected. For all countries but Côte d'Ivoire (where French is most widely spread as a language spoken in students' homes), the difference between student achievement in small villages and median performance is about twice as high in grade 2 than in grade 5. In Burkina Faso and Senegal the difference reaches about 15 percentage points, which is substantial. We thus observe an acute disadvantage of students in rural areas at this point.

However, given the much reduced differences in grade 5, this acute disadvantage does not seem to be persistent, so that we cannot speak of marginalization as defined by UNESCO (2010). All in all, it seems that African education systems manage relatively well to balance out initial geographical disadvantages.

It should be noted, however, that this conclusion can, in fact, only be drawn if there is no systematic change in the student population which is itself related to the geographical disadvantages. It is conceivable that among the geographically

disadvantaged students, those who face serious difficulties simply drop out, whereas drop out is much more rare in the more geographically advantaged urban areas. In this case the observed convergence of scores would be simply an artifact of unequal drop out. To be more confident about our argument, we will therefore have to consider whether drop out is considerably stronger for students in small villages than for other students.

To study drop out between grades 2 and 5, we need data for the same group of students over time. This data is available for Senegal. In addition, Senegal is a particularly interesting case to study since, according to Figure 3.1, the convergence of scores of students from small villages to median scores between grades 2 and 5 is particularly strong (especially in literacy).

One conceptional problem arises here: If a student is not present at the day of the test, this does not necessarily mean that he or she dropped out of school. Indeed, in the sample, we have various cases of students missing in one year, but participating again later. As a practical solution to this problem, we will consider that any student who is missing (at least) during the last two waves of the survey dropped out from school.[7] In Table 3.1 we compare the geographic characteristics of students who dropped out with their peers who did not.

What we find is the opposite of what might have been expected. Generally, it seems that dropout is a much more acute problem in urban than in rural areas. This may be due to higher opportunity cost of schooling in urban areas (although returns to schooling should also be higher). In small villages, dropout is a smaller problem than in any other geographic location, and it is strongest in suburban areas. Within the rural, and within the urban areas, differences are rather moderate.

Table 3.1: Geographical distribution of dropouts and non-dropouts, Senegal 1995-2000

Location	Dropout	No dropout	No. of obs.
Town	40.4%	59.6%	1038 (100%)
Suburb	44.4%	55.6%	160 (100%)
Big village	30.3%	69.7%	340 (100%)
Small village	28.0%	72.0%	257 (100%)
Non identified	35.0%	65.0%	60 (100%)
No. of observations	686	1169	1855

Running a multivariate probit regression on dropout using location as well as various combinations of the socio-economic index (to be discussed below), local languages, student's sex and the student's pre-test scores as controls, the above result is confirmed (not shown). Senegalese students drop out significantly more often in urban areas. In fact, apart from the pre-test score, this appears to be the only variable within this set of variables which strongly and consistenly influences dropout.

These results demonstrate that convergence of scores across rural and urban areas is in fact not an artifact of dropout, at least for Senegal. We therefore conclude that although students in isolated areas seem to have a worse starting position within school, this disadvantage shrinks over time and turns out to be far less substantial when students arrive at higher classes. In terms of educational achievement, it does not seem that rural isolation is a very strong factor of educational marginalization. The special case of Mauritius represents a notable exception.

Finally, to assess whether this result is robust over time, we can further compare the situation in 1995 to the situation in 2005 in the two countries for which we have two

[7] Considering all those students as dropouts who are missing during the final wave (i.e. during the final year of assessment) would lead to a strong risk of confounding students just missing class on the particular day of the test (e.g. due to illness) with actual drop-outs. However, when a student is missing in two consecutive years, this should, in most cases, correspond to actual drop-out.

rounds of data collection in our dataset (Cameroon and Madagascar). In the analysis underlying the previous discussion, this information has been pooled. Figures distinguishing between the two periods are presented in Annex 2.

It turns out that these additional details do not add much to our general results. While there is some – albeit limited – increase in the advantage of the most advantaged students (i.e. those in towns), there is no clear change in the situation of the most disadvantaged students (in small villages) relative to the respective median scores. In 5th grade (i.e. after the education system could balance out some of the initial inequalities), the relative position of students from small villages improved in Cameroon, but worsened in Madagascar. None of the changes is extremely strong.

Let us now move on to consider potential educational marginalization as a consequence of ***socio-economic status***. In both PASEC and SACMEQ, this is assessed through a count of household items. For PASEC, the items considered in this study are: refrigerator, tap, car, tv, radio, flush (water) toilet and electricity. For SACMEQ, the corresponding items are: refrigerator, car, tv, radio, telephone, water and electricity. By simply building the sum of these items, for both PASEC and SACMEQ we obtain an indicator ranging from 0 to 7.[8]

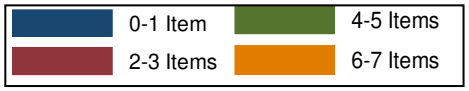
Considering that students with 0-1 (or perhaps even 0-3) items are at a high risk of being at a strong disadvantage with respect to learning in school, we proceed in a similar way as before by presenting graphs which compare the achievement of students in these groups with median performance and the performance of their economically better of peers. Again, overall the results depicted in Figures 3.3 and 3.4 correspond to expectations in that average scores rise with the number of household possessions. Most students report a very low number of items so that the group with 2-3 items often obtains scores already beyond the median value.

Surprisingly, however, even for the lowest level of household possessions, results are generally not very different from the median. As opposed to geographic location, this holds for the early as much as for the later grades. We thus do not observe a significant positive influence of the education system here which would reduce initial differences over time. Rather, again at the exception of Mauritius, right from 2nd grade onwards, scores of students reporting to have 0-1 items only, are not more than half of an international standard deviation below the median score. In most countries, the only group with scores substantially different from the median (and all other socio-economic groups) is the one with the maximum number of possessions (6-7). For literacy where this group stands out most, its scores are about one full international standard deviation above the median in three countries (Kenya, Namibia and Uganda). Thus, what we can observe is not really marginalization of the poorest, but rather, in many countries, a substantial advantage of a small number of students at the very high end of our socio-economic index.

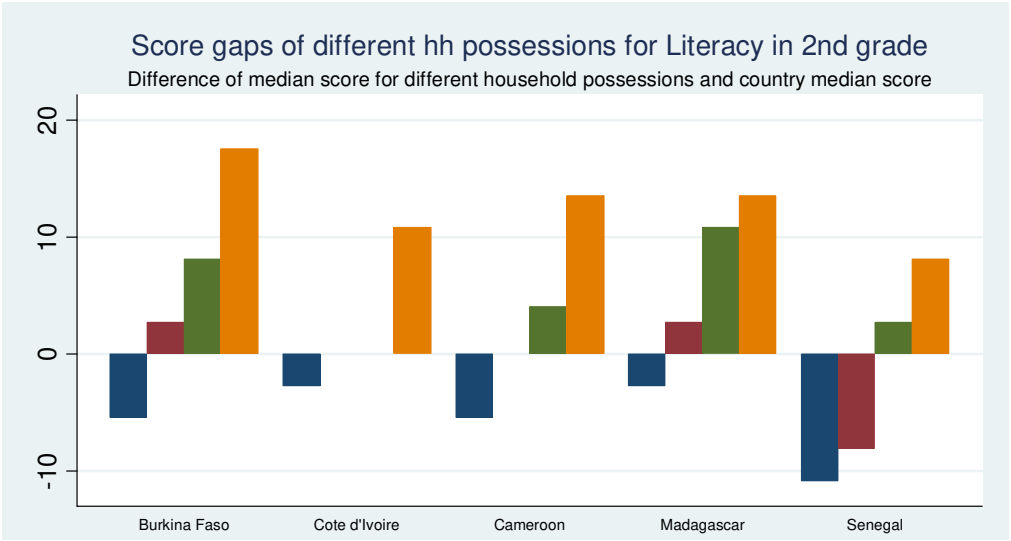
It is interesting to again look at exceptional country cases in more detail. Notably, in Mauritius, the situation is just opposite of the typical situation described above. In literacy, students with only 0-1 household items obtain scores which lie a full international standard deviation below the country's median score. For both, literacy and mathematics, in fact all three groups with less than 6 household items obtain scores strongly below the median. This sheds light on the fact that Mauritius is a much wealthier country than all the other countries considered here; and in this country, all students with possessions below 6 items represent a relatively small minority with considerable disadvantages in terms of educational outcomes. Further, these students coincide with the ones who have already been described as

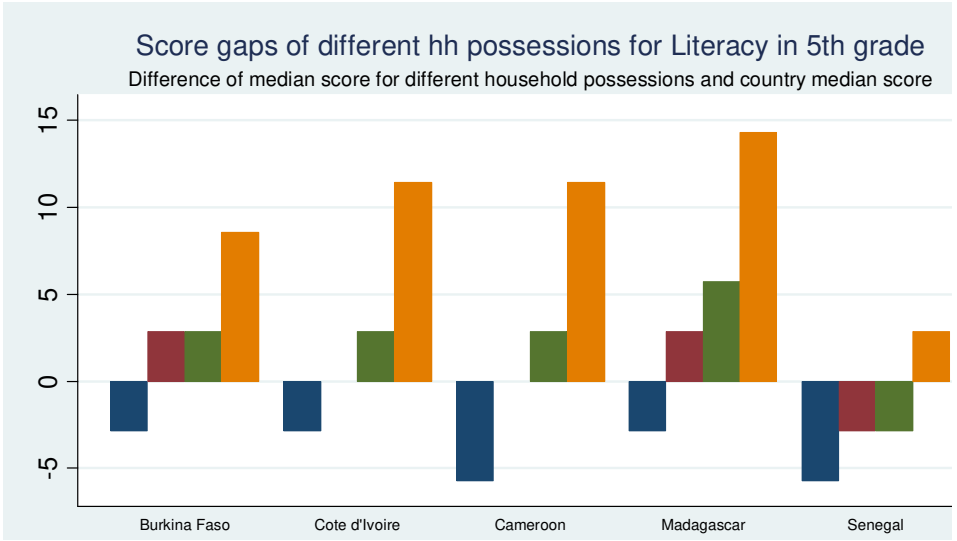
[8] We also tried other indicators such as the first principle component from different combinations of single items and parental education. In all cases, the resulting indicators were correlated with the simple additive index with coefficients higher than 0.98. In such a situation the choice of the indicator should not make much difference for the statistical results. The simple additive index, however, has the advantage to be easier to interpret. This is why we use the simple additive index for our analysis in this paper.

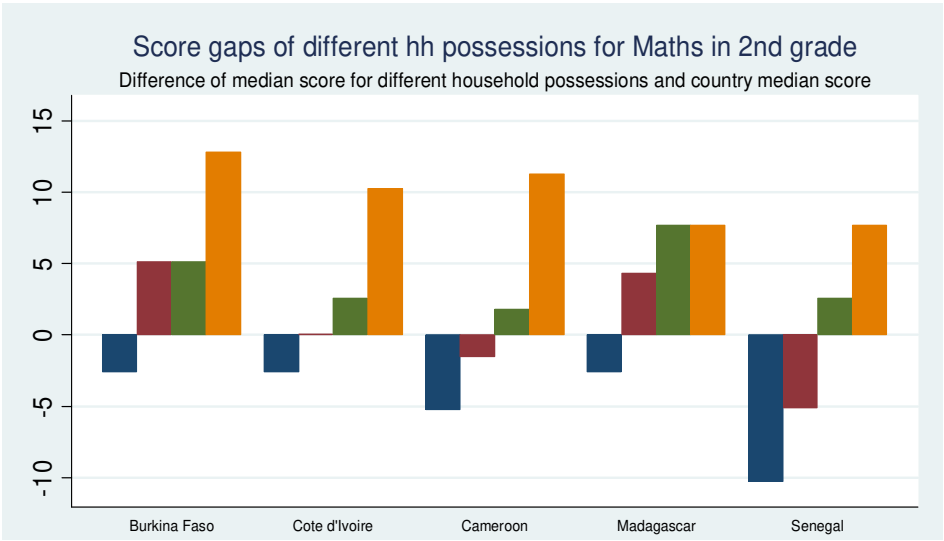
Figure 3.3: Socio-economic status and scores, PASEC, by country, subject and grade



Note: Data for Madagascar and Cameroon is pooled over both waves of data collection (for changes over time see Annex 2.)







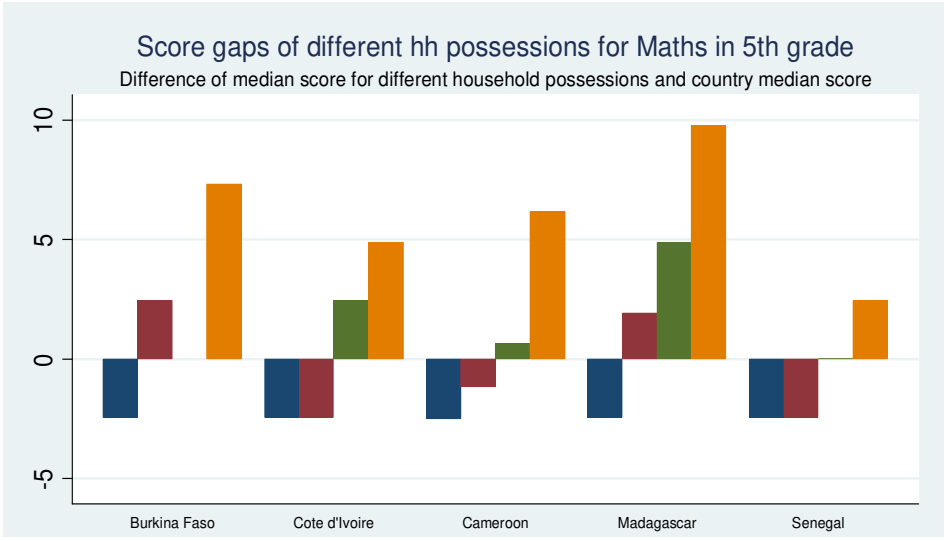
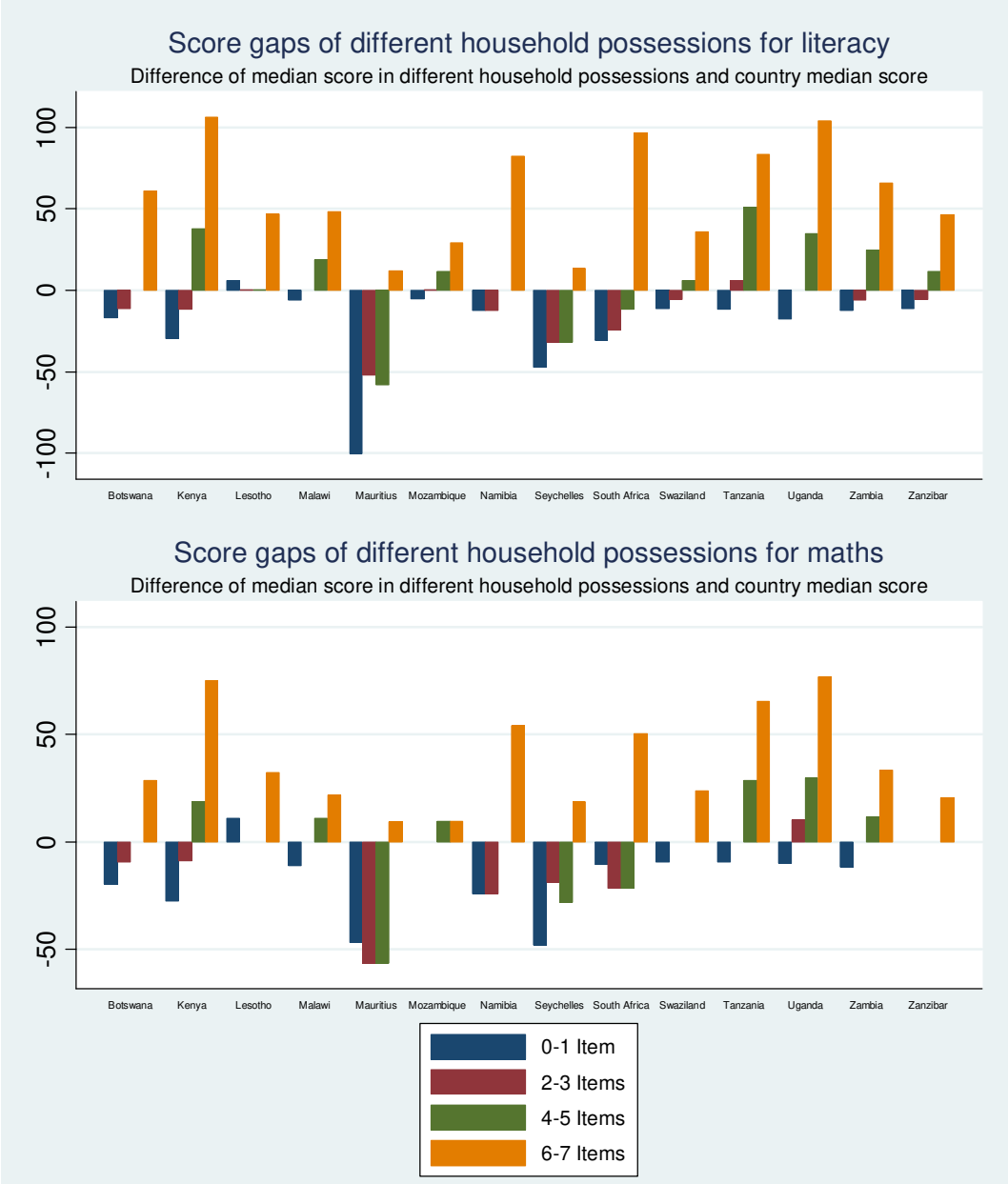


Figure 3.4: Socio-economic status and scores, SACMEQ, by country and subject



educationally marginalized when discussing geographical isolation. While these students may still do better than some of their peers in other countries, within Mauritius, there seems to be a strong and persistent disadvantage of these students.

It should be noted that for the second richest country, the Seychelles, the situation of the different socio-economic groups shows some similarities to the situation in Mauritius. However, the overall spread of scores is much more limited, especially for literacy, indicating a stronger educational inclusiveness.

Finally, we can again compare the situation in 1995 to the situation in 2005 for Cameroon and Madagascar. Figure 3.3 in Annex 3 presents this comparison. Similar to the results for the geographic location, no notable change in the situation of the economically most disadvantaged group is discernible from this comparison. In Cameroon, their situation relative to the median slightly improves, in Madagascar it slightly worsens in grade 2 and remains constant in grade 5.

To sum up the discussion on socio-economic background, we can conclude that generally, only towards the upper end of our household item possession scale, an additional item really shows a noticeable effect on student achievement. For the majority of the poor, be it with possessions of 1-2, 2-3 or 4-5 items, not much difference in scores can be observed. Ignoring individual country differences and presenting the full distribution of scores (across all countries of each dataset) by number of household possessions, this result becomes even clearer. The corresponding box plots (Figures A3.1-A3.3) are presented in Annex 3.

Since common understanding does not allow us to define the "marginalized" as a majority, socio-economic family background – at least as far as measurable by counting household items – does not seem to lend itself to an identification of educationally marginalized groups of students. It should be noted, however, that there may also be a problem of unidentified non-response coded as 0 ("does not possess"). This may lead to an upward bias of mean achievement for the group 0-1 items. Results in this section therefore need to be considered with caution.

Let us finally proceed with an assessment of educational marginalization based on ***cultural characteristics***. In the PASEC dataset, we can distinguish students by the language they speak at home. This allows us to approach cultural characteristics from an ethno-linguistic perspective. Unfortunately, we do not have any similar data for Anglophone Africa. The only language related question on which information is available in SACMEQ is whether English is spoken at home. Therefore, our discussion will mainly concentrate on PASEC countries in the following.[9]

With respect to language groups, we do not have any prior hypothesis concerning marginalization. We simply consider that there might be some groups in each country which suffer from substantially greater educational disadvantages. Moreover, as the colonial language is usually the language of instruction, and literacy is measured in terms of knowledge in French or English, we assume that students speaking these languages at home are in an advantaged position compared to their peers. Furthermore, speaking French or English at home is strongly correlated with urban location and high socio-economic status.

However, with respect to which might be the most disadvantaged groups, our approach is merely explorative. In order to get a general overview of the relationship between language groups and student achievement, we present these groups for all PASEC countries jointly whereby the countries in which this language is spoken, as well as the number of relevant observations in our dataset are presented in parenthesis after the name of each language. Readers interested in a country-by-country presentation of the results are referred to Annex 4 which provides individual figures for grades 2 and 5, followed by tables presenting the shares of students speaking the different languages within each country.

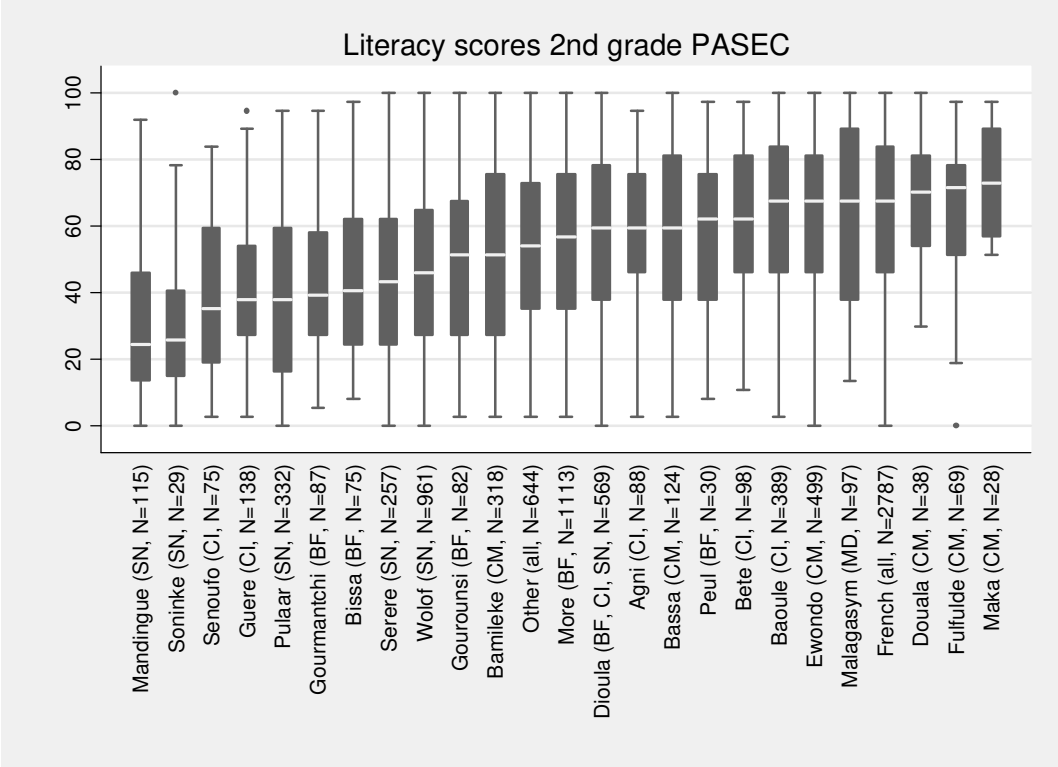
Figures 3.5 and 3.6 present the distribution of scores for literacy and mathematics respectively. Especially in literacy, we again observe the important influence of national education systems. In grade 5 the belonging to a specific national education system appears to be the strongest determinant of classification in the overall ranking of language groups (ordered by their respective median performance). This is far less obvious in grade 2.

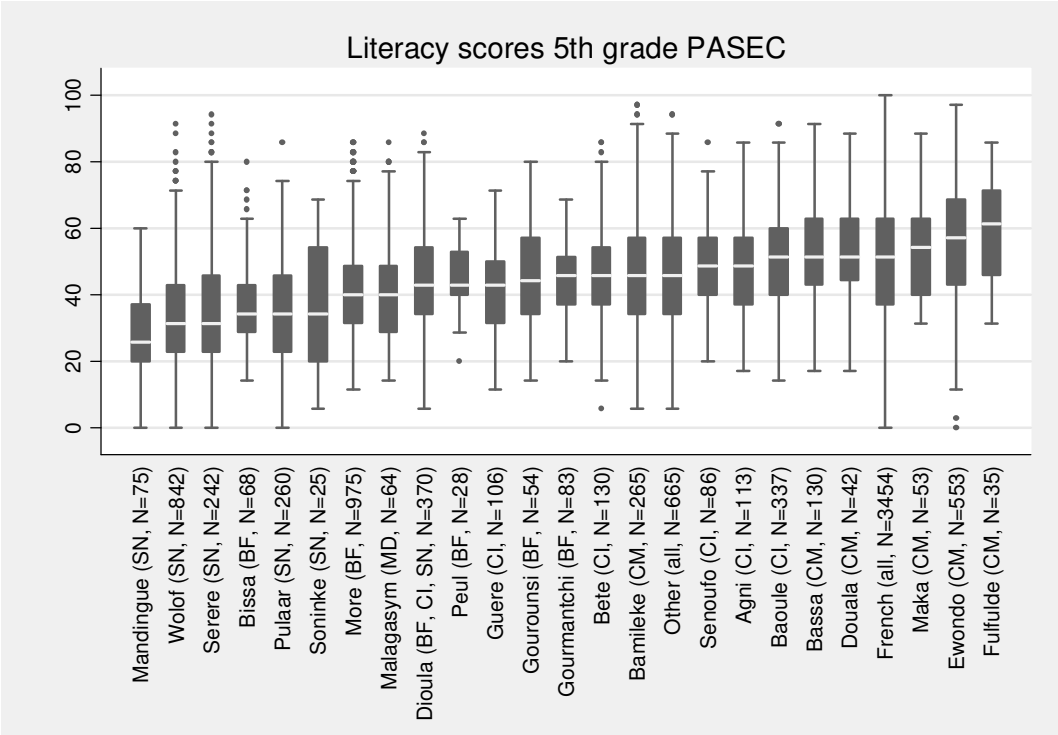
Burkina Faso appears to be the country whose language groups show the greatest spread over the whole range, notably in 5th grade mathematics, with Bissa consistently at the lower end. With respect to Cameroon, whose language groups generally concentrate towards the high end of the scale, Bamileke falls out as one language group whose members appear to do consistently worse than their peers within the country. Similarly, Guere speaking children consistently under-perform in

[9] SACMEQ distinguishes between different districts which would, in principle, allow us to differentiate at least geographically (beyond the rural-urban perspective). However, districts are numbered only and not attributed a name, so that they cannot be used to derive any meaningful results here.

Cote d'Ivoire, albeit with a somewhat smaller difference to other language groups (see also Annex 4, Figure A4.3).

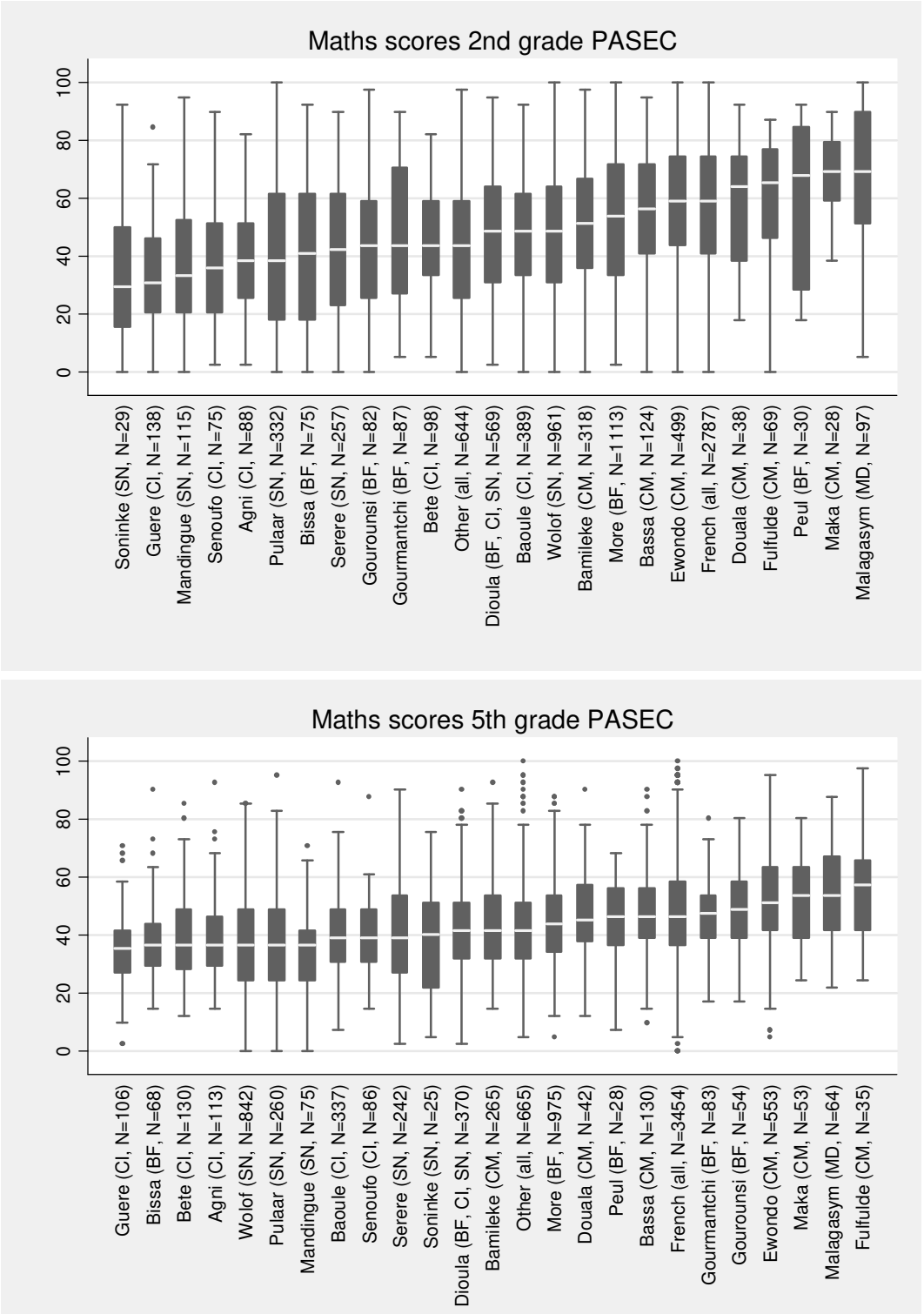
Figure 3.5: PASEC Literacy scores by language group





Notes: BF=Burkina Faso, CI=Cote d'Ivoire, CM= Cameroon, MD=Madagascar, SN=Senegal
Only data of the first round of surveys is considered for CM and MD.

Figure 3.6: PASEC Mathematics scores by language group

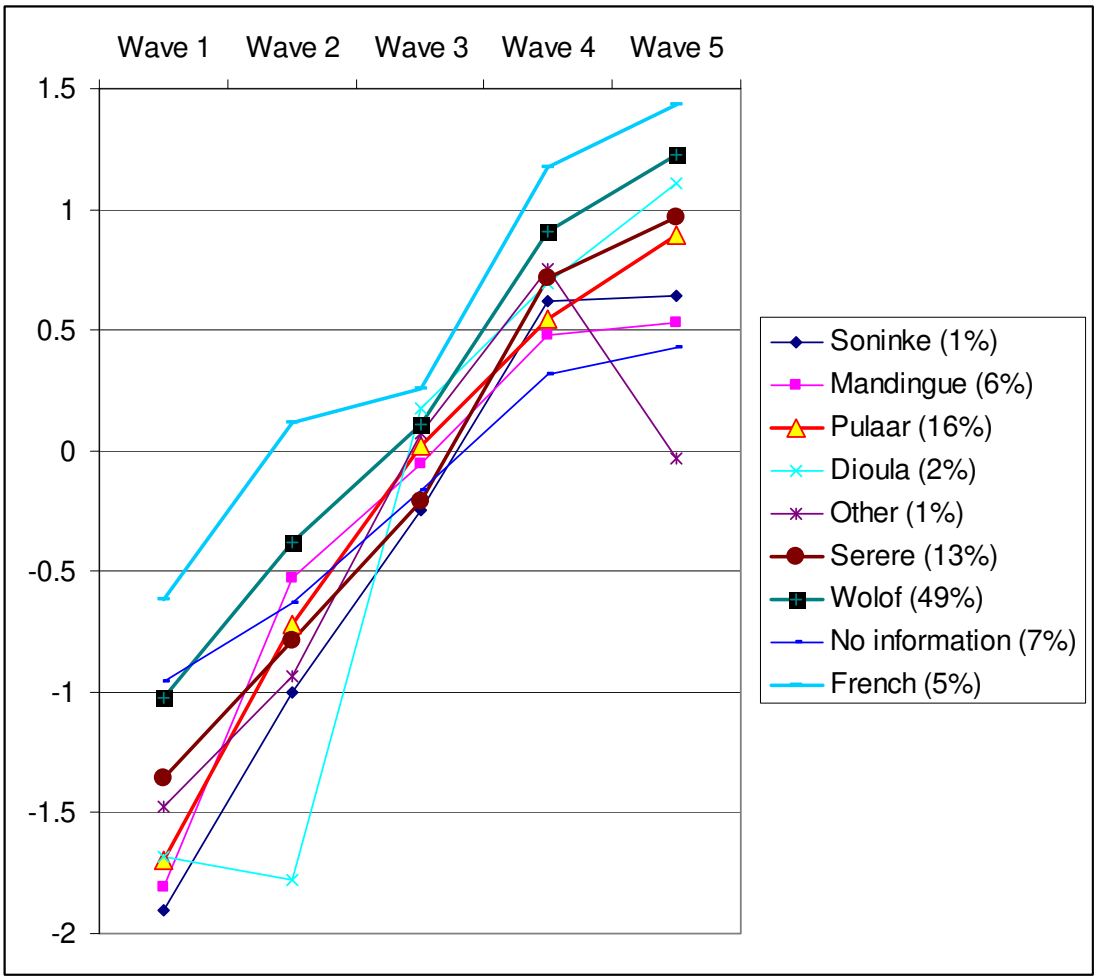


Notes: BF=Burkina Faso, CI=Cote d'Ivoire, CM= Cameroon, MD=Madagascar, SN=Senegal
Only data of the first round of surveys is considered for CM and MD.

In Senegal, Wolof speaking children are among the worst performers in 5th grade (second lowest median value in mathematics and literacy, visible for literacy only in the individual country graph in which Dioula is disaggregated by country; see Annex 4, Figure A4.4). However, they constitute the biggest language group in the country and, in fact, obtain relatively high scores in grade 2 (by far the highest in mathematics). Therefore, they can certainly not be looked upon as a marginalized group. Moreover, the differences are not so strong as to be sure that this may not be simply a coincidental fact which may be different in a different year. Indeed when we

look at the Senegalese panel data to show the changing position of different language groups over the whole period of primary education, we obtain quite a different impression. Figure 3.7 presents the results.

Figure 3.7: Student achievement by language group and year in school, mathematics, panel Senegal (1995-2000)



Notes:
Student scores are scaled to be comparable over time (wle with mean 0, std. 1), cf. Section 2.

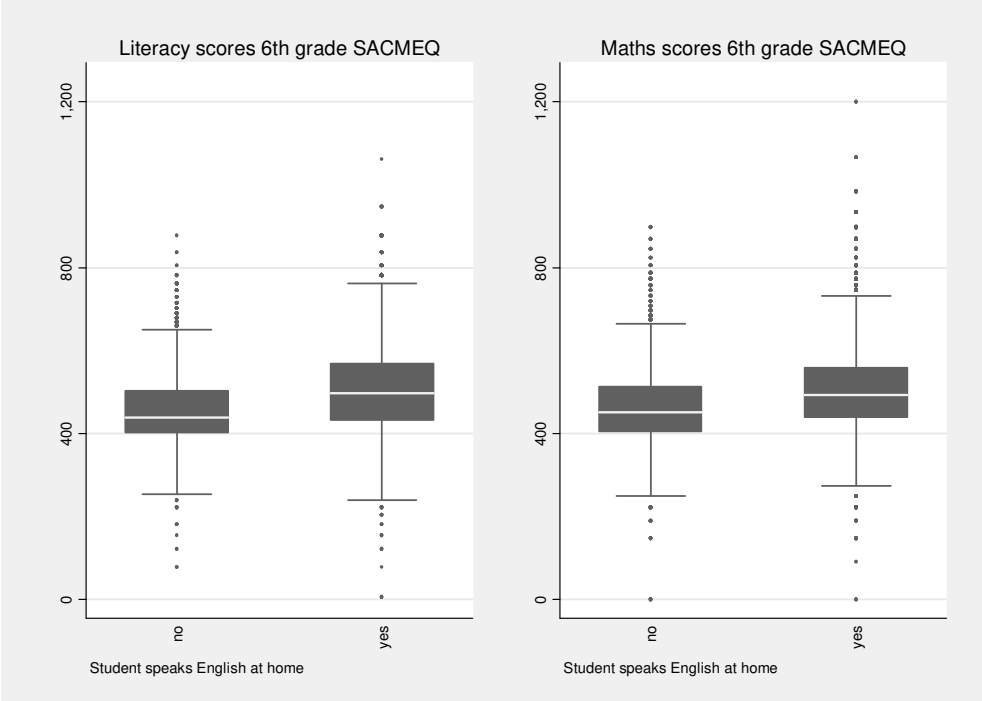
The waves indicate the year of the survey from 1995 to 2000. Students were followed over time from the beginning to the end of primary education. Wave 1 includes students in 2nd grade, wave 2 students in 3rd grade and repeaters, etc. In the last year of the survey (wave 5), most students have reached 6th grade, but a large minority is also still in lower grades due to repetition. As students progress over time, i.e. from wave 1 to wave 5, learning leads to higher achievement as indicated by the positive slopes of the lines (except for a few cases concerning language groups with few observations and, hence, very instable average values). The lines for two different language groups intersect whenever the mean achievement of one group is relatively lower in one year, but relatively higher in the other year. Only the line for French speaking students lies consistently above all other lines and never intersects with any other line. This indicates that throughout the years, students speaking French at home show a higher average mathematics achievement than students with any other language background in Senegal. No language group shows a performance consistently below all others.

Wolof is relatively high up on the list, and this consistently over all years of primary education. Generally, Wolof speakers are topped only by the group of students speaking French at home. At the same time, scores of all local language groups are relatively close. No language appears to be left behind. In fact, no language group is lagging behind all others more than a quarter of a standard deviation (more than 0.25 points on the above scale) for any two consecutive periods. Moreover, there are multiple crossings of the different lines, e.g. between the second and the third biggest language groups Pulaar and Serere. Thus, there is clearly no evidence of marginalization for any of the language groups.

As expected, however, if French is spoken at home, the student will generally do better than his or her peers with other language backgrounds. This is visible on Figure 3.7 despite the fact that this figure only presents scores for mathematics. We find similar evidence of the relevance of the colonial language for SACMEQ countries (see Figure 3.8; for readers not used to boxplots, see footnote 10). Nevertheless, it is interesting to note that the difference is not so strong that it always dominates. In Cameroon and Senegal 5th grade, other language groups slightly outperform French speaking students. As clearly shown in Figures 3.5 and 3.6, taking together French speakers from all PASEC countries, there are even various other language groups doing better. This underscores again that the countries' education system can (and often do) make up for initial disadvantages.

Generally, just as for geographical and socio-economic characteristics, it is difficult to make out any educational marginalization based on language groups. It seems that, at least when looking at each of these characteristics individually, no single group can be identified as strongly and persistently disadvantaged. In the following, we will therefore reverse the perspective and examine the worst performing students to obtain an overview of how they are characterized. Finally, we will look at the different characteristics jointly in order to analyze whether an accumulation of various (slight) disadvantages may still lead to marginalization of certain groups.

Figure 3.8: Distribution of scores for students speaking or not speaking English at home, SACMEQ[10]



[10] A boxplot provides a five-number summary of the distribution of any numerical variable. The five numbers presented in the boxplot are (i) the smallest observation not considered an outlier, (ii) the lower quartile (lower border of the actual box), (iii) the median, (iv) the upper quartile (upper border of the actual box), and (v) largest observation not considered an outlier. Any observations lying more than 1.5 times the inter-quartile range (IQR) below the first quartile, or more than 1.5 times the IQR over the third quartile are considered as outliers and displayed by single dots.

4. Characteristics of least performing students

We now consider the lowest decile of the students' score distribution and compile some potentially relevant characteristics of this particular group of students. In addition, for the purpose of comparison, we show the same variables for students from the middle of the distribution function (45-55%) as well as from the highest decile. To simplify formulations we will speak of the intermediate group as the "median performers".

The specific characteristics we will look at, again take up the socio-economic context, and the language issue. With respect to the socio-economic index, we now consider each of its constituent household items individually. We also add a simple indicator of parental education to complement the analysis. In addition to other robustness checks discussed earlier (see footnote 8), this makes sure we do not miss to observe a relevant pattern simply for having inadequately assembled the different items into our socio-economic index. Indeed, some items, e.g. "radio" in some of the PASEC countries and "bicycle" in some of the SACMEQ countries, might be inferior goods, i.e. goods the availability of which decreases as income increases (as they are being replaced by, e.g. tv or cars respectively). At least this could be true for some countries and certain parts of the income distribution. This makes these items problematic parts of an indicator which is just the sum of the different items.

With respect to languages, we only show the share of students speaking the colonial language (French or English) which is the only information available in SACMEQ. Finally, we also consider students' sex by presenting the share of boys among the weakest decile, the middle 10% performers and the strongest decile.

Table 4.1 summarizes the results across all PASEC countries for which individual information is provided in Annex 5, Tables A5.1 - A5.4. It shows that across all PASEC countries, there is typically a statistically significant, but rather small difference between the lowest performance decile and the median performers in the share of students possessing the individual items. The share is more than 5% higher for median performers for tv and electricity. Moreover, the share of students speaking French at home is 5% higher for the median performers than for the weak performers. Note that the differences in household possessions are much more pronounced when we compare the median to the top performers, at least for literacy (both grades) and mathematics 2nd grade. Girls and boys are equally distributed among the low and the median performers and slightly overrepresented among the best performers.

In Table 4.2 we present the same information for the two individual PASEC countries for which we can compare the development over time. However, we show this development with respect to the average students in these countries. The table simply intends to shed light on the fact that over time, the overall context of students has changed. As enrollment increased, a significantly higher number of children with a family context less conducive to learning were admitted to school. Indeed Table 4.2 shows that in 2005, the average student's household possessions were much less than in 1995. This is evident for all individual items, except for radios in the case of Cameroon. Moreover, the percentage of students speaking French at home dropped considerably over time.

Similar evidence of a strong decline in socio-economic background is available from SACMEQ country studies comparing data for the mid 1990s to data after 2000 (see e.g. Chimombo et al. 2005 for Malawi).

For our purpose, this implies that the whole distribution may have shifted to the left. Those students who might have been conceived as marginalized in terms of educational achievement in 1995, may no more be looked upon as such today, because many more socially disadvantaged students have entered the education system. In fact, it seems that the "disadvantaged" actually represent a majority. In this context, it is very difficult to find any evidence of marginalization.

Table 4.1: Characteristics of least performers and median performers, PASEC[1]

A. Literacy

Percentage of students' households with

Grade		fridge		car		tv		radio		water toilet		electricity		tap		sum of items (0-7)		literacy parents (0-2)[2]		speaks French at home		share of male students	
	lowest																						
2nd	10%	**0.17**	*0.01*	**0.16**	*0.01*	**0.28**	*0.02*	**0.73**	*0.02*	**0.20**	*0.02*	**0.35**	*0.02*	**0.22**	*0.02*	**2.11**	*0.07*			**0.17**	*0.01*	**0.51**	*0.01*
	middle																						
	10%	**0.22**	*0.01*	**0.16**	*0.01*	**0.35**	*0.01*	**0.75**	*0.01*	**0.20**	*0.01*	**0.42**	*0.02*	**0.27**	*0.02*	**2.38**	*0.07*			**0.24**	*0.01*	**0.52**	*0.01*
	highest																						
	10%	**0.35**	*0.02*	**0.22**	*0.02*	**0.48**	*0.03*	**0.80**	*0.02*	**0.28**	*0.03*	**0.53**	*0.03*	**0.44**	*0.03*	**3.10**	*0.14*			**0.31**	*0.02*	**0.48**	*0.02*
	lowest																						
5th	10%	**0.18**	*0.01*	**0.16**	*0.01*	**0.32**	*0.02*	**0.81**	*0.01*	**0.15**	*0.01*	**0.32**	*0.02*	**0.23**	*0.01*	**2.16**	*0.06*	**1.06**	*0.03*	**0.28**	*0.02*	**0.52**	*0.01*
	middle																						
	10%	**0.22**	*0.01*	**0.17**	*0.01*	**0.38**	*0.01*	**0.84**	*0.01*	**0.20**	*0.01*	**0.36**	*0.01*	**0.28**	*0.01*	**2.44**	*0.06*	**1.25**	*0.02*	**0.31**	*0.01*	**0.51**	*0.01*
	highest																						
	10%	**0.39**	*0.03*	**0.28**	*0.02*	**0.56**	*0.03*	**0.89**	*0.01*	**0.34**	*0.02*	**0.50**	*0.03*	**0.45**	*0.03*	**3.42**	*0.14*	**1.40**	*0.04*	**0.39**	*0.03*	**0.48**	*0.01*

B. Mathematics

Percentage of students' households with

Grade		fridge		car		tv		radio		water toilet		electricity		tap		sum of items (0-7)		literacy parents (0-2)[2]		speaks French at home		share of male students	
	lowest																						
2nd	10%	**0.16**	*0.01*	**0.14**	*0.01*	**0.25**	*0.02*	**0.69**	*0.01*	**0.16**	*0.01*	**0.31**	*0.02*	**0.19**	*0.01*	**1.89**	*0.07*			**0.16**	*0.01*	**0.50**	*0.02*
	middle																						
	10%	**0.23**	*0.01*	**0.19**	*0.01*	**0.36**	*0.01*	**0.76**	*0.01*	**0.21**	*0.01*	**0.44**	*0.02*	**0.30**	*0.01*	**2.50**	*0.07*			**0.24**	*0.01*	**0.51**	*0.01*
	highest																						
	10%	**0.33**	*0.02*	**0.22**	*0.02*	**0.45**	*0.02*	**0.79**	*0.02*	**0.28**	*0.02*	**0.51**	*0.02*	**0.40**	*0.03*	**2.96**	*0.13*			**0.30**	*0.02*	**0.54**	*0.02*
	lowest																						
5th	10%	**0.22**	*0.01*	**0.18**	*0.01*	**0.36**	*0.02*	**0.81**	*0.01*	**0.21**	*0.02*	**0.35**	*0.02*	**0.28**	*0.02*	**2.41**	*0.08*	**1.12**	*0.03*	**0.26**	*0.02*	**0.49**	*0.01*
	middle																						
	10%	**0.27**	*0.01*	**0.21**	*0.01*	**0.47**	*0.02*	**0.85**	*0.01*	**0.23**	*0.01*	**0.44**	*0.02*	**0.35**	*0.02*	**2.82**	*0.07*	**1.19**	*0.02*	**0.34**	*0.02*	**0.52**	*0.01*
	highest																						
	10%	**0.31**	*0.02*	**0.23**	*0.02*	**0.47**	*0.02*	**0.87**	*0.01*	**0.27**	*0.02*	**0.44**	*0.03*	**0.36**	*0.02*	**2.95**	*0.12*	**1.32**	*0.04*	**0.34**	*0.02*	**0.52**	*0.01*

[1] Standard errors of the mean in italics.
[2] Coding of 'Literacy parents': 0 - neither mother nor father, 1 - mother or father, 2 - both are literate.

Table 4.2: Characteristics of average students 1995 and 2005, Cameroon and Madagascar

		Percentage of students' households with																	
		fridge		car		tv		radio		water toilet		electricity		tap		sum of items (0-7)		speaks French at home		share of male students	
CM 2005	lowest 10%	**0.11**	*0.04*	**0.02**	*0.07*	**0.04**	*0.13*	**0.04**	*0.76*	**0.09**	*0.03*	**0.30**	*0.05*	**0.17**	*0.04*	**1.82**	*0.17*	**0.18**	*0.04*	**0.58**	*0.03*
	middle 10%	**0.09**	*0.02*	**0.10**	*0.03*	**0.22**	*0.04*	**0.81**	*0.03*	**0.10**	*0.03*	**0.35**	*0.05*	**0.22**	*0.04*	**1.89**	*0.17*	**0.21**	*0.04*	**0.50**	*0.03*
	highest 10%	**0.15**	*0.05*	**0.10**	*0.05*	**0.26**	*0.06*	**0.74**	*0.08*	**0.11**	*0.04*	**0.36**	*0.08*	**0.17**	*0.05*	**1.89**	*0.33*	**0.25**	*0.06*	**0.65**	*0.05*
CM 1995	lowest 10%	**0.21**	*0.04*	**0.22**	*0.04*	**0.31**	*0.06*	**0.73**	*0.04*	**0.22**	*0.04*	**0.64**	*0.06*	**0.24**	*0.04*	**2.57**	*0.23*	**0.34**	*0.06*	**0.45**	*0.04*
	middle 10%	**0.36**	*0.04*	**0.25**	*0.03*	**0.41**	*0.04*	**0.71**	*0.03*	**0.29**	*0.04*	**0.61**	*0.05*	**0.34**	*0.04*	**2.98**	*0.23*	**0.45**	*0.04*	**0.48**	*0.03*
	highest 10%	**0.54**	*0.07*	**0.43**	*0.07*	**0.65**	*0.06*	**0.81**	*0.05*	**0.44**	*0.08*	**0.78**	*0.05*	**0.62**	*0.07*	**4.27**	*0.39*	**0.49**	*0.08*	**0.49**	*0.03*
MD 2005	lowest 10%	**0.00**	*0.00*	**0.01**	*0.01*	**0.04**	*0.01*	**0.67**	*0.04*	**0.07**	*0.04*	**0.04**	*0.01*	**0.04**	*0.02*	**0.87**	*0.08*	**0.01**	*0.01*	**0.49**	*0.04*
	middle 10%	**0.03**	*0.01*	**0.04**	*0.01*	**0.14**	*0.03*	**0.76**	*0.03*	**0.09**	*0.02*	**0.23**	*0.04*	**0.11**	*0.02*	**1.39**	*0.11*	**0.02**	*0.01*	**0.52**	*0.03*
	highest 10%	**0.11**	*0.04*	**0.12**	*0.05*	**0.43**	*0.06*	**0.90**	*0.04*	**0.13**	*0.05*	**0.55**	*0.07*	**0.17**	*0.04*	**2.41**	*0.26*	**0.03**	*0.01*	**0.51**	*0.04*
MD 1995	lowest 10%	**0.07**	*0.03*	**0.07**	*0.02*	**0.12**	*0.03*	**0.55**	*0.05*	**0.31**	*0.06*	**0.15**	*0.03*	**0.11**	*0.03*	**1.39**	*0.13*	**0.06**	*0.02*	**0.50**	*0.03*
	middle 10%	**0.12**	*0.02*	**0.09**	*0.02*	**0.17**	*0.03*	**0.64**	*0.05*	**0.19**	*0.04*	**0.32**	*0.04*	**0.14**	*0.03*	**1.66**	*0.12*	**0.05**	*0.02*	**0.45**	*0.04*
	highest 10%	**0.25**	*0.06*	**0.18**	*0.07*	**0.38**	*0.09*	**0.62**	*0.10*	**0.25**	*0.09*	**0.41**	*0.09*	**0.33**	*0.09*	**2.42**	*0.52*	**0.11**	*0.04*	**0.45**	*0.04*

Note: Standard errors of the mean in italics.

Table 4.3: Characteristics of worst performers, median and highest performers, SACMEQ[1]

A. Literacy

	Percentage of students' households with																					
	fridge		car		tv		radio		water		electricity		table		sum of items (0-7)		education parents[2]		speaks English at home		share of male students	
lowest 10%	**0.22**	*0.01*	**0.22**	*0.01*	**0.32**	*0.01*	**0.81**	*0.01*	**0.31**	*0.01*	**0.23**	*0.01*	**0.64**	*0.01*	**2.77**	*0.05*	**6.02**	*0.05*	**0.63**	*0.01*	**0.54**	*0.01*
middle 10%	**0.24**	*0.01*	**0.21**	*0.01*	**0.35**	*0.01*	**0.85**	*0.01*	**0.34**	*0.01*	**0.27**	*0.01*	**0.70**	*0.01*	**2.96**	*0.04*	**6.55**	*0.05*	**0.76**	*0.01*	**0.49**	*0.01*
highest 10%	**0.55**	*0.02*	**0.40**	*0.02*	**0.63**	*0.02*	**0.89**	*0.01*	**0.63**	*0.02*	**0.61**	*0.02*	**0.83**	*0.01*	**4.53**	*0.09*	**8.55**	*0.10*	**0.91**	*0.01*	**0.49**	*0.01*

B. Mathematics

	Percentage of students' households with																					
	fridge		car		tv		radio		water		electricity		table		sum of items (0-7)		education parents[2]		speaks English at home		share of male students	
lowest 10%	**0.22**	*0.01*	**0.22**	*0.01*	**0.34**	*0.01*	**0.83**	*0.01*	**0.33**	*0.01*	**0.27**	*0.01*	**0.66**	*0.01*	**2.88**	*0.04*	**6.26**	*0.05*	**0.65**	*0.01*	**0.47**	*0.01*
middle 10%	**0.25**	*0.01*	**0.22**	*0.01*	**0.35**	*0.01*	**0.85**	*0.01*	**0.34**	*0.01*	**0.28**	*0.01*	**0.70**	*0.01*	**2.99**	*0.04*	**6.56**	*0.04*	**0.75**	*0.01*	**0.49**	*0.01*
highest 10%	**0.49**	*0.02*	**0.38**	*0.02*	**0.56**	*0.02*	**0.89**	*0.01*	**0.58**	*0.02*	**0.55**	*0.02*	**0.81**	*0.01*	**4.26**	*0.10*	**8.15**	*0.11*	**0.90**	*0.01*	**0.55**	*0.01*

[1] Standard errors of the mean in italics.
[2] Sum of mother's and father's education, each ranging from 1 (lowest) to 6 (highest), i.e. overall index range from 2 to 12.

Percentage of students' households with

	fridge		car		tv		radio		water		electricity		table		sum of items (0-7)		education parents		speaks English at home		male	
l dec	**0.22**	*0.01*	**0.22**	*0.01*	**0.34**	*0.01*	**0.83**	*0.01*	**0.33**	*0.01*	**0.27**	*0.01*	**0.66**	*0.01*	**2.88**	*0.04*	**6.26**	*0.05*	**0.65**	*0.01*	**0.47**	*0.01*
m dec	**0.25**	*0.01*	**0.22**	*0.01*	**0.35**	*0.01*	**0.85**	*0.01*	**0.34**	*0.01*	**0.28**	*0.01*	**0.70**	*0.01*	**2.99**	*0.04*	**6.56**	*0.04*	**0.75**	*0.01*	**0.49**	*0.01*
h dec	**0.49**	*0.02*	**0.38**	*0.02*	**0.56**	*0.02*	**0.89**	*0.01*	**0.58**	*0.02*	**0.55**	*0.02*	**0.81**	*0.01*	**4.26**	*0.10*	**8.15**	*0.11*	**0.90**	*0.01*	**0.55**	*0.01*

Table 4.3: Characteristics of worst performers and median performers, literacy, SACMEQjjjj

Percentage of students' households with

	fridge		car		tv		ra
lowest 10%	**0.22**	*0.01*	**0.22**	*0.01*	**0.32**	*0.01*	**0.8**
middle 10%	**0.24**	*0.01*	**0.21**	*0.01*	**0.35**	*0.01*	**0.8**
highest 10%	**0.55**	*0.02*	**0.40**	*0.02*	**0.63**	*0.02*	**0.8**

Percentage of students' households with

	fridge		car		tv		radio		water		electricity		table		sum of items (0-7)		education parents		speaks English at home		male	
lowest 10%	**0.22**	*0.01*	**0.22**	*0.01*	**0.32**	*0.01*	**0.81**	*0.01*	**0.31**	*0.01*	**0.23**	*0.01*	**0.64**	*0.01*	**2.77**	*0.05*	**6.02**	*0.05*	**0.63**	*0.01*	**0.54**	*0.01*
middle 10%	**0.24**	*0.01*	**0.21**	*0.01*	**0.35**	*0.01*	**0.85**	*0.01*	**0.34**	*0.01*	**0.27**	*0.01*	**0.70**	*0.01*	**2.96**	*0.04*	**6.55**	*0.05*	**0.76**	*0.01*	**0.49**	*0.01*
highest 10%	**0.55**	*0.02*	**0.40**	*0.02*	**0.63**	*0.02*	**0.89**	*0.01*	**0.63**	*0.02*	**0.61**	*0.02*	**0.83**	*0.01*	**4.53**	*0.09*	**8.55**	*0.10*	**0.91**	*0.01*	**0.49**	*0.01*

In Table 4.3 (and Annex 5, Tables 5.5 and 5.6 for individual countries) we compare weak performers with median and top performers in SACMEQ countries. The results are similar as for PASEC. For many items, the difference between weak and median performers is not important in value terms, and certainly less important than the differences between time periods mentioned above. Again, the differences between median and top performers are much stronger than between low and median performers, though. This is consistent with our earlier observation that we have such an important share of students from with a very low socio-economic background, that the median performers still lie more or less within this share. This is why we observe sizeable differences in our socio-economic indicators only at the higher end of the distribution. Thus, as long as we do not wish to speak of a marginalized majority (which would be a contradiction in itself) our descriptive statistics do not provide us with evidence for any sizeable achievement related educational marginalization due to socio-economic background.

The multivariate analysis in Section 5 will show whether some more evidence for marginalization can be found when we consider the cumulated effect of the different variables characterizing relatively disadvantaged students.

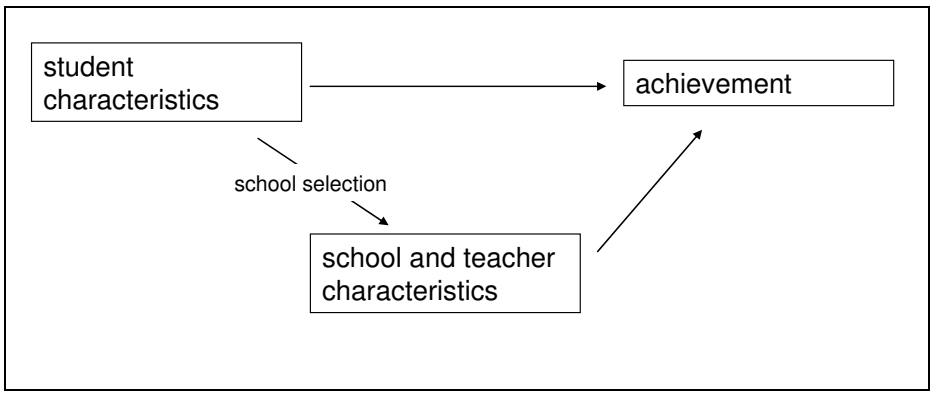
5. Multivariate Analysis

To analyze the joint effect of different variables, we follow a strategy in which we first specify a complete education production including school and teacher characteristics, country fixed effects and student characteristics. This allows us to identify the partial effects of different marginalization indicators (wealth, language, rural/urban etc) on achievement scores. In addition we can specify an added value model for PASEC which controls for initial achievement and allows us to directly look at achievement growth in one year. To test for robustness we specify different models and also look at 2nd and 5th grade separately in the case of PASEC. These model specifications are also described and interpreted focusing on different aspects (on inputs to education) in Fehrler, Michaelowa and Wechtler (2009).

As it is likely that some of the disadvantages in achievement for marginalized groups comes through an adverse selection process, which makes the most marginalized go to the worst schools, the full model only identifies a partial effect as it measures the influence of student characteristics controlling for school and teacher quality. In a second step, we therefore, construct models in which only student characteristics and country and location dummies are used as explanatory variables. These models allow us to estimate the full effect of student characteristics on achievement, even if this effect is indirect (for details on the variables used in this model see Annex Table A6.4).

Figure 5.1 sketches the two different models with and without control for school and teacher characteristics.

Figure 5.1: Possible direct and indirect effects of marginalization



All regression models except for one have the achievement score as dependent variable. To identify marginalization we later use the estimated coefficients and typical values for household possession, location etc for the socio-economically disadvantaged and compare the predicted scores for literacy and mathematics. For SACMEQ there also exists a definition of a minimum achievement level for reading that all students should reach. We estimate the effect of different indicators of socio-economic status on the probability to reach this level in a probit model.

5.1 Regression methodology

All countries within each country group (SACMEQ/ PASEC) are considered jointly in a single regression. This has the considerable advantage that, due to the high total number of observations, even very small effects can be distinguished. Country differences are captured by country fixed effects.

We use two different econometric models to estimate the education production functions. For both SACMEQ and PASEC, model type A is the usual hierarchical linear (or multi-level) model with school random effects (for textbook expositions see for example Raudenbush and Bryk, 2002 or Goldstein, 2003). Estimations are carried out with generalized least squares (GLS) with the exception of SACMEQ regressions because the availability of sampling weights makes maximum likelihood estimation (MLE) computationally more attractive in the multi-level framework.

Model A has the advantage of providing a clear distinction between the explanations of the variance within and between schools. However, the true standard errors may be underestimated if sub-clusters exist (such as classes within schools for SACMEQ or groups of students living in the same area or doing their homework together), which lead to a variance structure different from the one explicitly specified. As a robustness check, we therefore introduce a model type B using the Stata survey sampling routine. For details, see Michaelowa and Wechtler (2006). For a comparison of the different methodologies and their results, see Brown and Micklewright (2004).

A relevant issue for our analysis is that PASEC is sampling students within a single class for each school while SACMEQ is randomly drawing students from the overall sixth grade population within each school in the sample. This implies that for a given number of students drawn in each school and grade (typically 20 students in both surveys), in SACMEQ, we have more variation between teacher and classroom environments, but with only few students to whom this information can be directly related. Conversely, in PASEC we have information on the students actually taught by the same teacher in exactly the same environment. These differences lead to different degrees of precision for our econometric estimates at the different levels (schools, teachers/ classrooms, and students).

In SACMEQ regressions, schools are the only level explicitly considered in the hierarchical models, and the primary sampling units in the survey regressions. In PASEC, the hierarchical level and the primary sampling unit considered is the classroom. The overall impact is difficult to predict. In any case, for SACMEQ, simple two-level hierarchical estimation models which do not take into account any sub-group clustering within schools might be problematic. This is the reason for the introduction of an alternative specification using Stata's survey sampling procedures as a robustness check.

5.2 Results

In the full model (Tables A6.2 and A6.3 in Annex 6) we see that students' household possessions have a significant direct effect on student achievement in both SACMEQ and PASEC and for both 2nd and 5th grade (6th for SACMEQ). The effect is relatively small though. In SACMEQ one additional item (max 14) raises the score by less than

1% of a standard deviation. In PASEC the effects range between 1 and 2% of a standard deviation across the specifications. The effect of having regular meals is also modest. A large effect is observed for SACMEQ for the dummy whether the student speaks English at home or not, where English speakers score 22-27% of standard deviation higher than non-speakers. This effect is much larger than for PASEC's 5th graders where it goes up to 8%. French speakers in 2nd grade fare up 16% of a standard deviation better than pupils not speaking French at home.[11] This is plausible, as 5th graders already had 4 years of schooling to learn French.

For SACMEQ we also observe relatively large peer effects. If the socio-economic background increases by 1 (max 15) achievement goes up by 4-7% of a standard deviation.

Whether or not the students' household possesses some books also influences achievement significantly. In PASEC this effect goes up to 10% of a standard deviation. This might reflect parents education or valuation of education and is also represented by the significantly positive effect of whether parents are literate or not.

By far the largest effects are observed for teaching language spoken at home and for socio-economic peer-effects.

Analyzing the same model, Fehrler, Michaelowa and Wechtler (2009) find that several school inputs like textbooks and student flow organization also have a significant and substantial effect on student achievement. Now if students from poor rural backgrounds go to bad schools, controlling for school inputs in the full model may hide parts of the effect of socio-economic marginalization.

Therefore, we will now turn to the models which do not control for school and teacher characteristics. The only variable on the school level which we leave in the models is socio-economic background of class mates because it is of particular interest. The regression coefficients for regressions on the scores as well as for a probit on whether a minimum standard for reading was reached are reported in Table 6.1.

It is interesting to see that most coefficients are very similar to the full model which estimates the partial effects. From this we can conclude that sorting of disadvantaged students into bad schools is not the main channel through which performance differences can be explained. The direct effect seems to be more important.[12]

The probit estimates for SACMEQ are equally interesting. In SACMEQ, there exists a certain minimum standard for reading proficiency which was agreed upon by the education authorities in the participating countries. The level is actually quite high and less than half the students reach it. The students not reaching this level are of particular interest when talking about marginalization. We see that again, speaking English at home and the socio-economic background of the classmates have a big influence on the probability of reaching the minimum achievement. In the table marginal effects are reported which indicate the change in the probability of reaching the standard for a unit change (holding all other variables at their mean). For Dummies the marginal effect is the effect from going from 0 to 1. We see that the probability of achieving the minimum standard rises by 16.4% if the pupil speaks English at home and by 5.1% if the socioeconomic background (measured on a scale from 0-15) rises by one point.

5.3 Marginalized groups

We now measure the achievement gap of socio-economically disadvantaged with respect to the socio-economic median by looking at the differences of the first decile

[11] The coefficient reported in the table times one over the standard deviation of the score gives the coefficient in terms of standard deviations.

[12] We ran single country regressions for all SACMEQ and PASEC countries for these models. The findings are robust with respect to the sign, although the size of the coefficients vary between countries. Robustness checks for the full model are discussed in Fehrler, Michaelowa and Wechtler (2009).

of the distribution in household possessions, meals, socio-economic background of peers etc. and the median. Then, using the estimated coefficients for these variables we compute the score gap between a hypothetical student with characteristics equal to the first decile of the distribution of each variable and a hypothetical student with characteristics equal to the median of the distributions.

Doing that for PASEC shows that the student with poor background scores 18-19% of a standard deviation worse in both subjects in 2nd grade and 21 and 31% worse in 5th grade in mathematics and literacy respectively. Most of the difference comes from the lower socio-economic background of class mates.

In SACMEQ the same exercise leads to larger differences. The hypothetical student with decile 1 characteristics scores 89 (literacy) and 75 (math) % of a standard deviation worse than the socio-economic median student. One third of this difference comes from the fact that the median student speaks English at home while the student from the lowest decile does not. Another third comes from the difference in the socio-economic background of the peers.

Only very few students are in the lowest decile for all the variables in Table 5.1. The hypothetical lowest decile student is therefore not typical in this sense. If we therefore restrict our analysis to two variables the results change, except for PASEC 2nd grade. For PASEC 2nd grade 4.5% of the students are in the lowest decile for household possessions and socio-economic peer effects, the two variables explaining the whole difference in the scores for this group (a number of other variables is not available for 2nd grade, see Annex 6, Table A6.1). If we focus on only these two variables for 5th grade 1.7% of all students are in the lowest decile for both variables and the score difference to the median student reduces to 12% of a standard deviation for literacy and to only 4 % for mathematics.

Table 5.1: First decile (i.e. potentially marginalized) and median for the distributions of selected explanatory variables

	SACMEQ		**PASEC**		
Variables	**1st decile**	**median**	Variables if coded differently	**1st decile**	**median**
Pupil's home possessions (e.g. newspaper, tv, fridge, etc.; 0-14)	**1.00**	**5.00**	(0-8)	**0.00**	**2.00**
Pupil's housing conditions (3=bad - 16=good)	**6.00**	**11.00**			
Pupil's meals per day (1=none at all - 12=3x every day)	**8.00**	**12.00**	(0-3)	**1.00**	**3.00**
Parental education (2=none - 12=both some post-secondary)	**4.00**	**7.00**	Parental literacy (0=none - 2=both are literate)	**0.00**	**1.00**
Number of books at pupil's home (0-250)	**0.00**	**5.00**	Pupil has some books at home (2)	**0.00**	**1.00**
Pupil speaks English at home	**0.00**	**1.00**	French (2)	**0.00**	**0.00**
Socio economic status of classmates (1-15)	**3.63**	**6.11**	(0-8)	**0.84**	**2.36**
School location (1=isolated-4=city)	**2.00**	**2.00**	dummy (0=rural, 1=urban)	**0.00**	**0.00**

In SACMEQ 3.3% of all students are in the lowest decile of the distributions of household possessions and peer socio-economic background. If we only consider these two variables the difference to the median student shrinks to 30% of a standard deviation for literacy and to 25% for mathematics.

Of course other groups, based on other variables can be formed but the ones discussed in the two preceding paragraph are those with the largest gaps.

5.4 Language groups

We ran single-country regressions for Senegal, Cameroon, Burkina Faso and Cote d'Ivoire with the same explanatory variables as in the 2nd grade regressions in Section 5.2 (Table A6.4) plus dummies for the language groups for these countries. We find that none of the local language groups performs significantly better than those students who speak French at home. The differences are larger and more often significant (5% level) for 2nd grade than for 5th grade. For 5th grade we find that Dioula and Bissa speakers in Burkina Faso perform significantly worse in mathematics (Bissa speakers also in literacy) than French speakers. No significant differences are observed in 5th grade Senegal for mathematics but regarding literacy Mandingue speakers perform significantly worse. In Cote d'Ivoire 5th grade Guere speakers perform significantly worse in both subjects. Bamileke speakers in Cameroon perform significantly worse in mathematics and literacy. The effects range between 21.4 and 40% of a standard deviation.

For 2nd grade larger differences are observed for both subjects. In Burkina Faso Gourounsi, Bissa and Gourmantchi perform much worse than French speakers in literacy with differences between 47.7 and 57.7% of a standard deviation. For mathematics the effects are smaller but also significant for these groups (except for Gourmantchi where it is not significant). In Cote d'Ivoire Senoufo and Guere speakers perform significantly worse than French speakers in literacy and Guere speakers also in mathematics (with differences higher for literacy, 51.5-65.4% of a standard deviation). In Cameroon the Bamileke speakers score 46.2% of standard deviation (literacy) and 33.7% of a standard deviation (mathematics) worse and in Senegal all groups except for the Serere speakers score massively worse than French speakers in both subjects. Especially bad perform Soninke speakers with gaps between 74.1 and 90.8 % of a standard deviation, although it should be kept in mind that the sample size of this group is very small (54).

Overall we find some sizable differences between the language groups with larger differences between some groups and French speakers for literacy and in particular in 2nd grade. However, while the differences with respect to French are obvious, it is much more difficult to single out any individual language group really left behind as compared to other local groups. We did not find clear evidence for this in any of the countries considered here.

Table 5.2: Language groups which score significantly worse than French speakers across countries

	Language groups which perform significantly worse than students speaking french at home (controlling for a number of socio-economic variables, see text)							
	BF	gap in % of a std dev	**CI**	gap in % of a std dev	**CM**	gap in % of a std dev	**SN**	gap in % of a std dev
2nd french	Gourounsi	47.7	Senoufo	65.4	Bamileke	46.9	Wolof	29.2
	Bissa	55	Guere	51.5			Pulaar	43.1
	Gourmantchi	57.7					Soninke	90.8
							Mandingue	65
5th french	Bissa	37.1	Guere	21.5	Bamileke	21.5	Mandingue	32.2
2nd maths	Gourounsi	50.4	Guere	28.1	Bamileke	25.4	Dioula	57.8
	Bissa	45.2					Pulaar	41.9
							Soninke	74.1
							Mandingue	48.1
5th maths	Dioula	21.4	Guere	17.6	Bamileke	25.4		
	Bissa	40						

6. Conclusions

As primary enrolment rates converge to full enrolment, formerly marginalized groups are no more excluded from schools. But does this end their marginalization? Or does marginalization remain in place, simply shifting from an exclusion from enrolment to an exclusion from acceptable achievement? In other words, will they receive education of a quality which is not significantly inferior to the quality of education for other parts of the student population? This is the question we asked at the beginning of this paper.

While we were looking at various potential factors of marginalization, both descriptive and multivariate analysis showed little evidence of a persistent and significant achievement disadvantage of any specific minority in the Sub-Saharan African countries considered here. Descriptive statistics rather point at significant advantages of a minority of well-off students than at specific disadvantages among the poor. In most countries analyzed here, poverty is so widely spread that it actually becomes difficult to single out the most disadvantaged within that group. Among the student population, this phenomenon becomes even stronger in recent years since increased enrolment rates opened access to education to an even larger number of students from isolated rural areas and / or with low socio-economic background.

The only countries which show some exceptional pattern in this context, are those which are considerably more wealthy than their neighbors, notably Mauritius, where educational marginalization was observable for the population on Rodrigues.

For the majority of the PASEC countries, for which data on individual language groups is available, we did not observe any striking disadvantage of any particular group either. While there is a certain spread of mean scores across languages, within any given country, differences in scores remain relatively small. To some extent, we also observe clear country clusters of language groups with similar achievement levels. This implies that the being part of a particular national education system is often more important than differences between cultural or ethnical groups.

Comparisons between 2nd and 5th grade students in PASEC also suggest that national education systems are able to balance out certain initial inequalities.

This result also matches well with the outcome of our multivariate regression analysis. This analysis shows that the effect of socio-economic and other disadvantages is mainly a direct rather than an indirect one, i.e. it is not channeled through a strong effect of school selection with better educational institutions exclusively available for well to do students and bad performing institutions absorbing the disadvantaged part of the student population. If this were the case the coefficients of the individual socio-economic background variables would change substantially between the full and the parsimonious model specifications. Rather, for the majority of students, schools appear to be of relatively equal quality – possibly, of course, all at the lower end of what one may consider as acceptable.

The multivariate analysis also shows that the impact of an accumulation of disadvantages (location, socio-economic background, parental education etc.) creates large learning deficits. However, students accumulating all of these disadvantages at once, appear to be rather rare in our sample.

All in all, it seems that marginalization in terms of educational achievement is not the key problem of primary education systems in the countries considered here. Once equal chances for enrolment can be provided to every child, educational marginalization does not appear to be very strong. However, the reason might be that a large rather than a small part of the student population study in school environments which are anything but conducive to quality learning. Rather than to focus quality improvement on specific areas or social groups, it thus appears reasonable to move forward with a rather broad based approach to improve educational achievement.

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Annex

Annex 1: Distribution of scores for SACMEC and PASEC countries

Figure A1.1: PASEC 2nd grade, literacy and mathematics

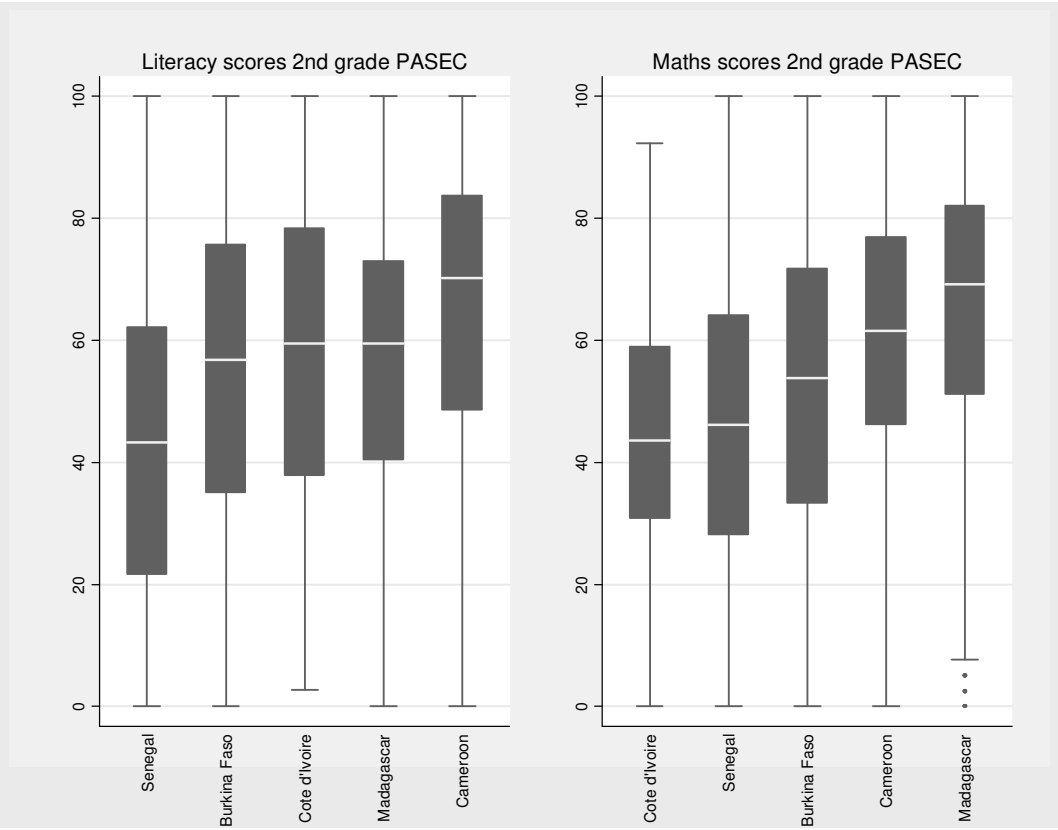


Figure A1.2: PASEC 5th grade, literacy and mathematics

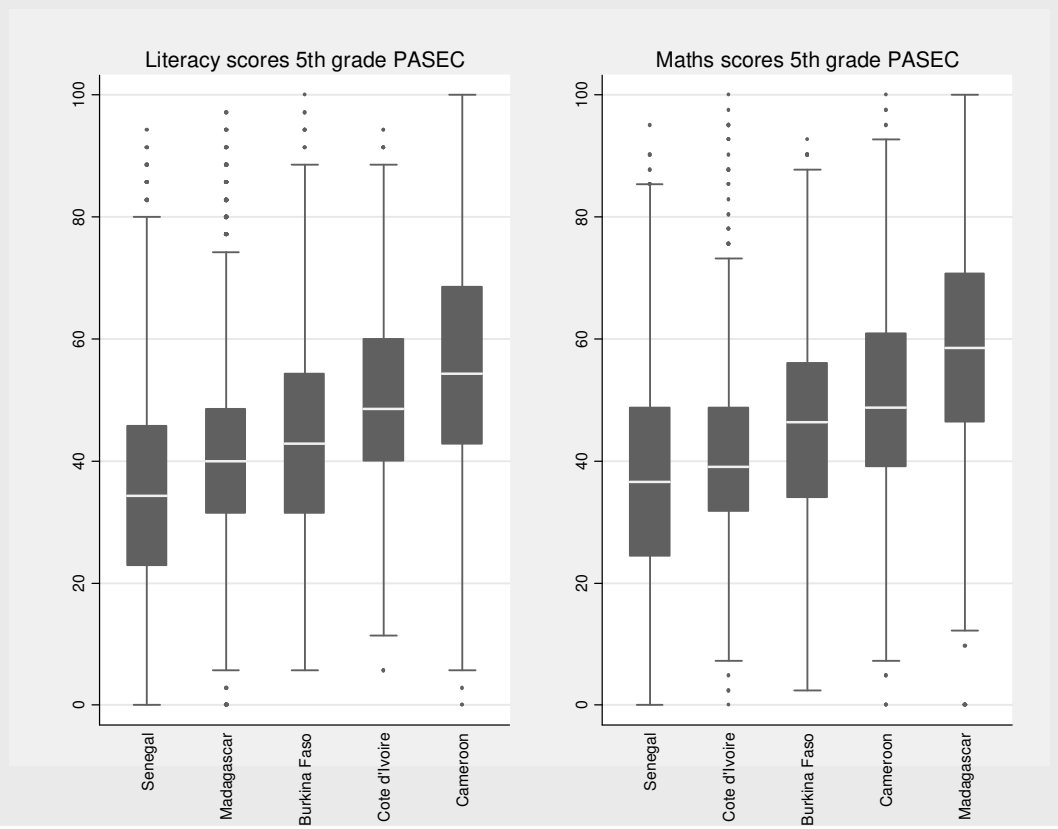
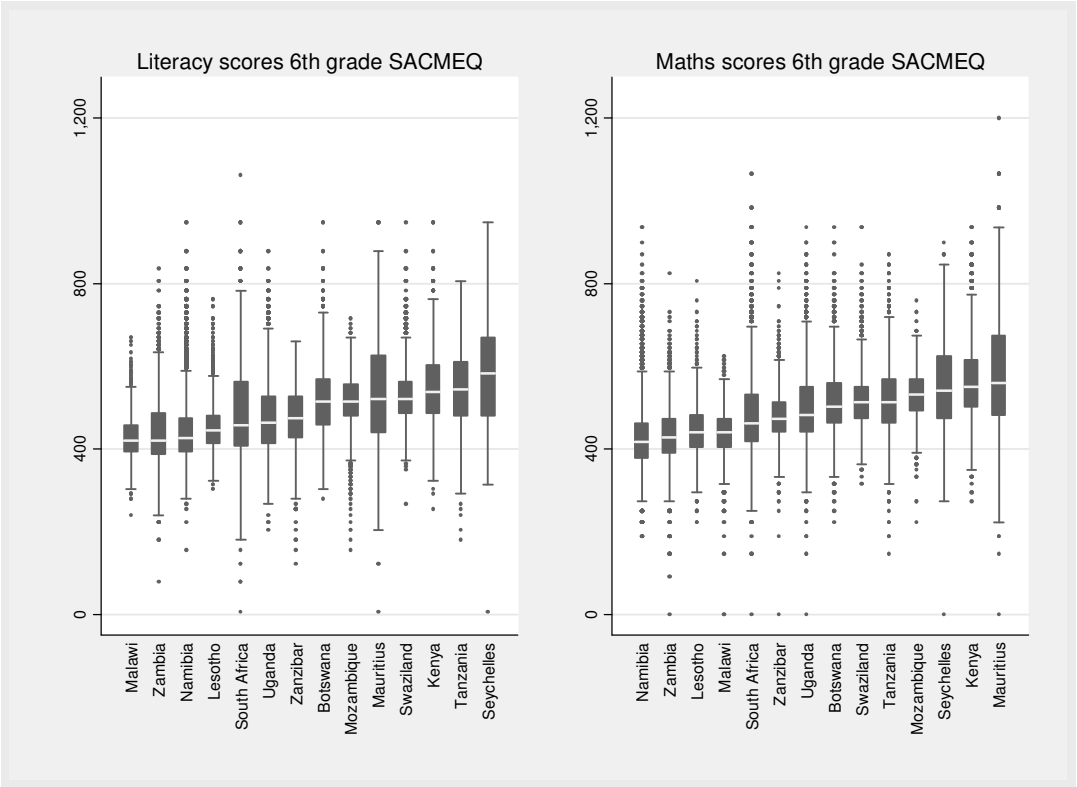


Figure A1.3: SACMEQ 6th grade, literacy and mathematics



Annex 2: Score differences and geographical location

Figure A2.1: Changes between 1995 and 2005 in Cameroon and Madagascar, by grade and subject

Annex 3: Distribution of scores by household possessions

Figure A3.1: PASEC 2nd grade, literacy and mathematics

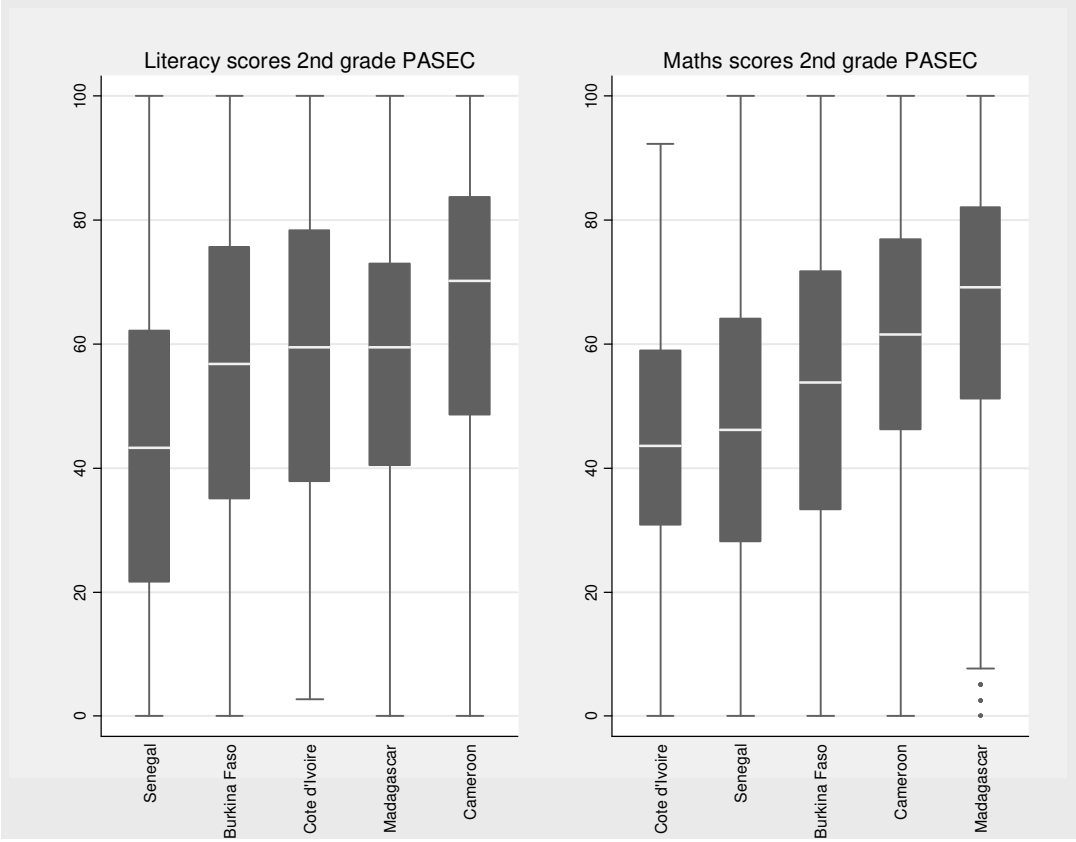


Figure A3.2: PASEC 5th grade, literacy and mathematics

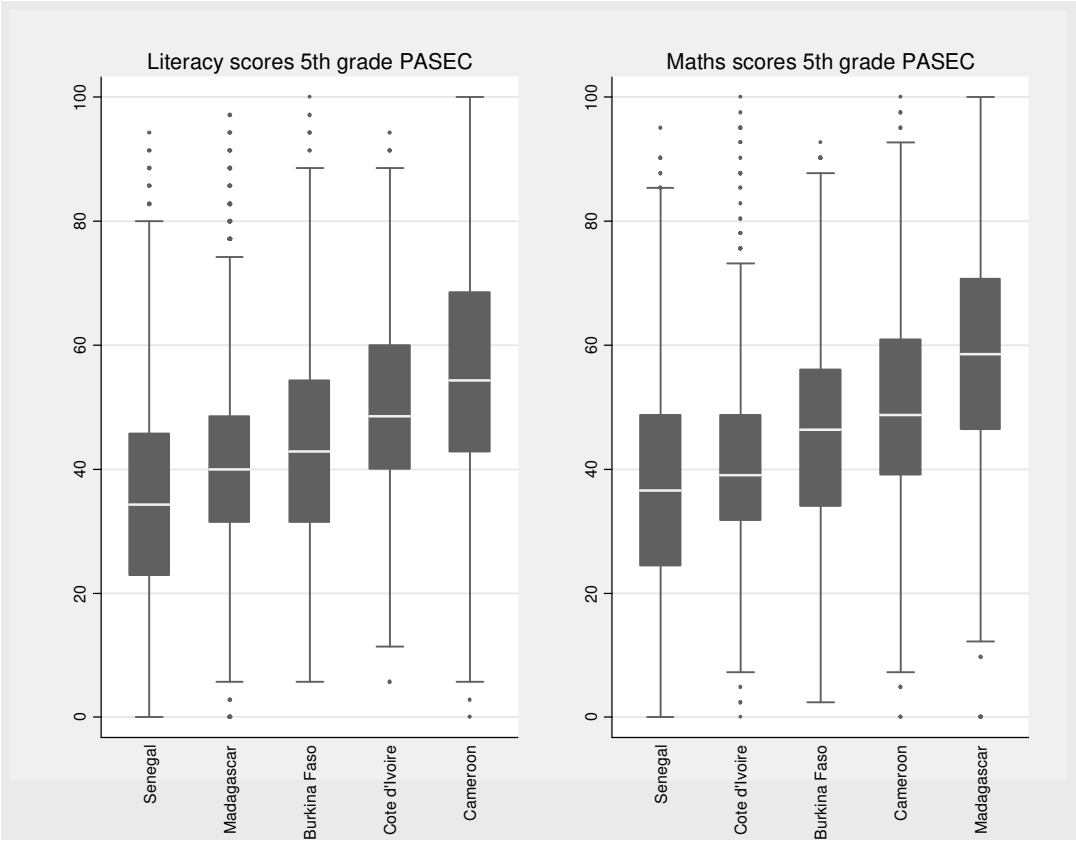


Figure A3.2: SACMEQ 6nd grade, literacy and mathematics

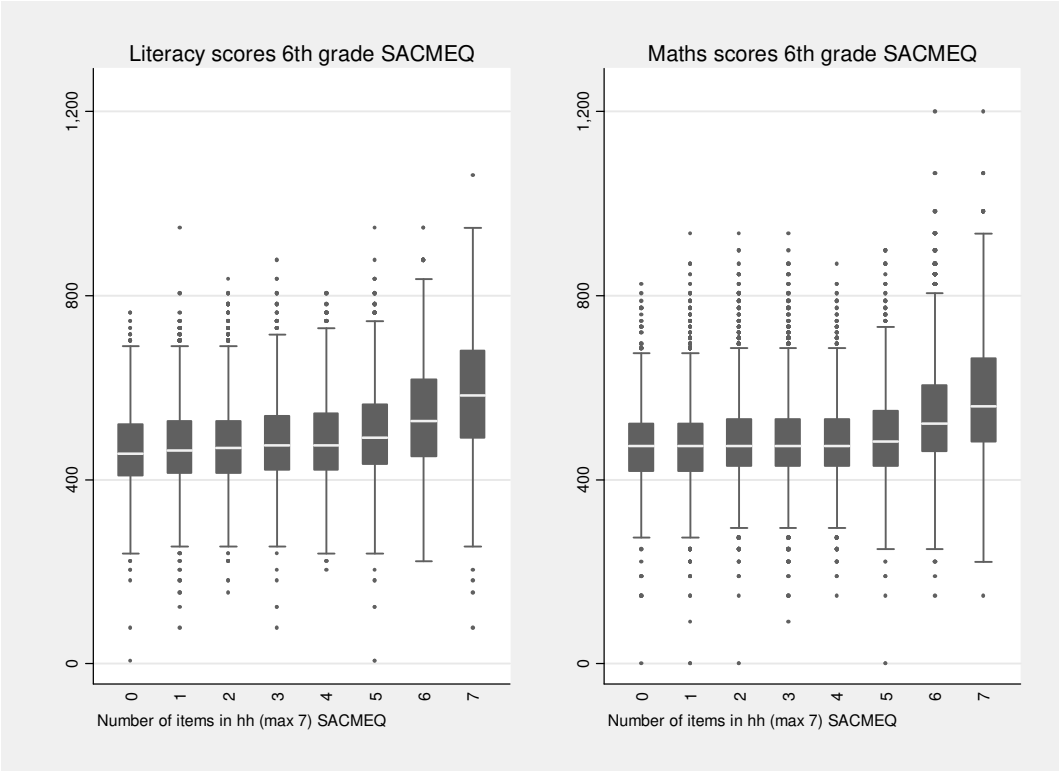
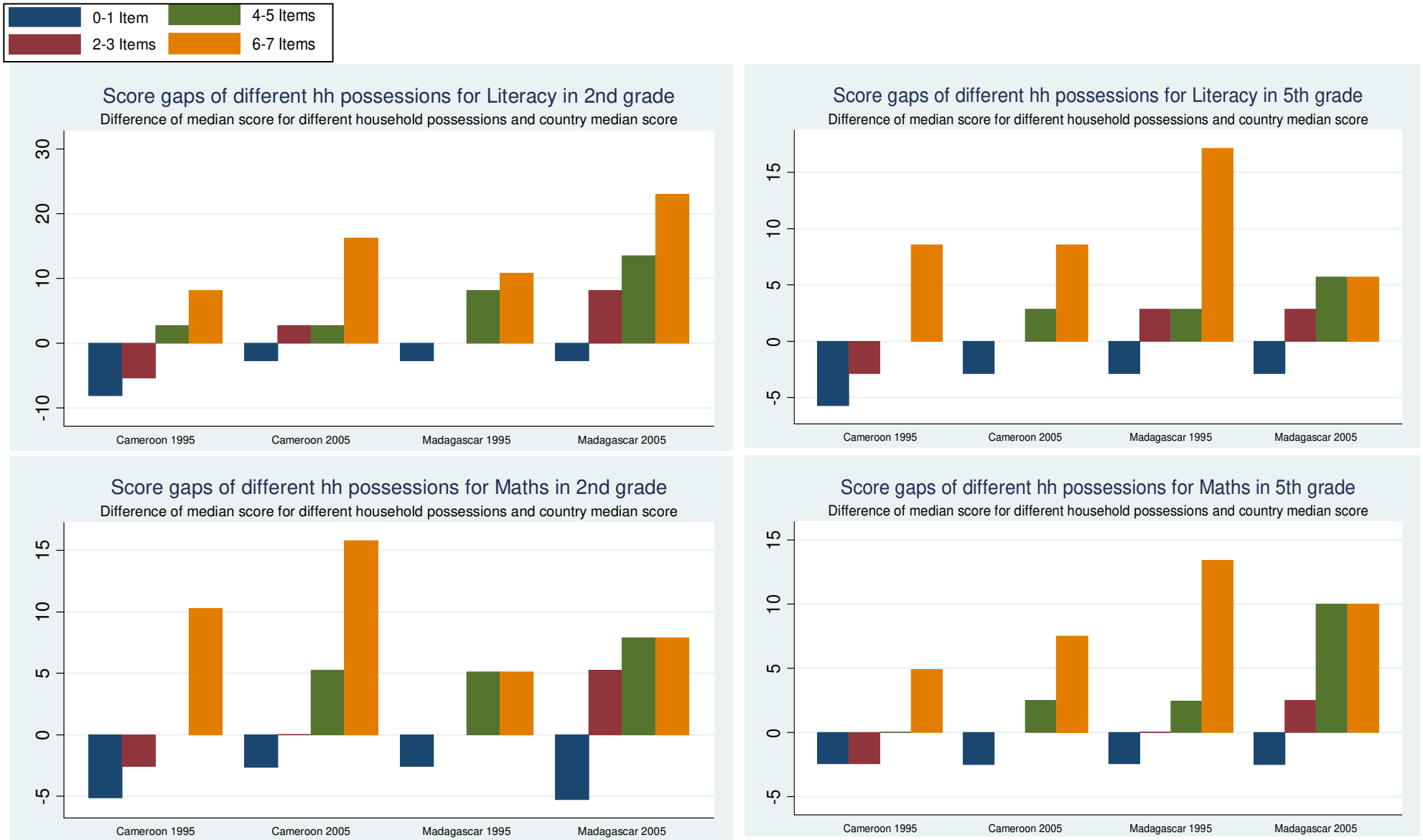
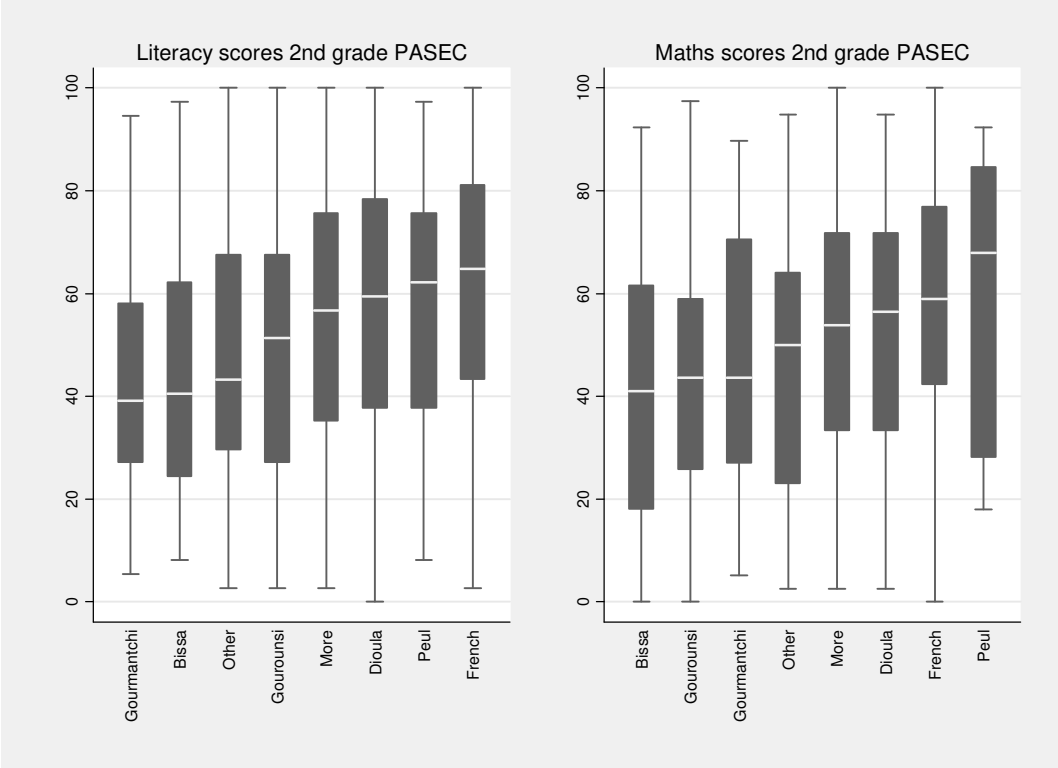


Figure A3.3: Changes between 1995 and 2005 in Cameroon and Madagascar, by grade and subject



Annex 4: Distribution of scores by language, subject and grade

Figure A4.1: Burkina Faso



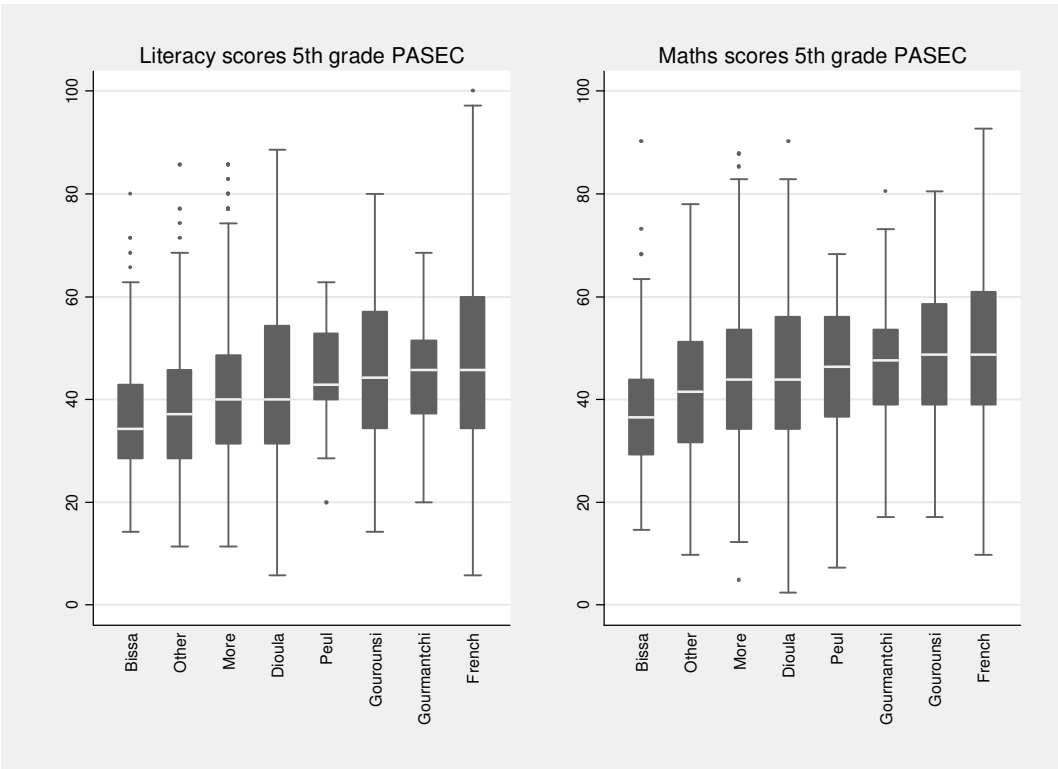


Figure A4.2: Cameroon

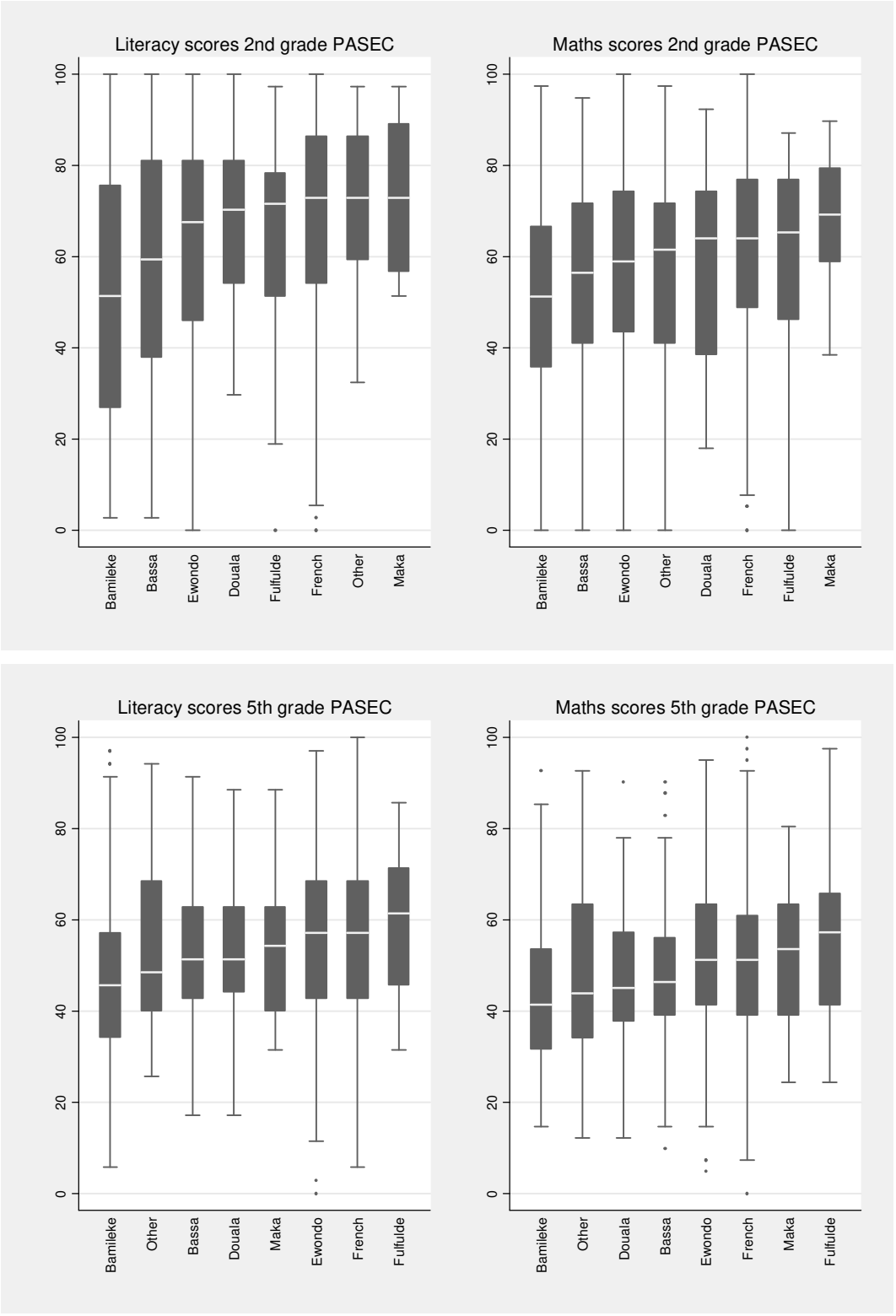


Figure A4.3: Cote d'Ivoire

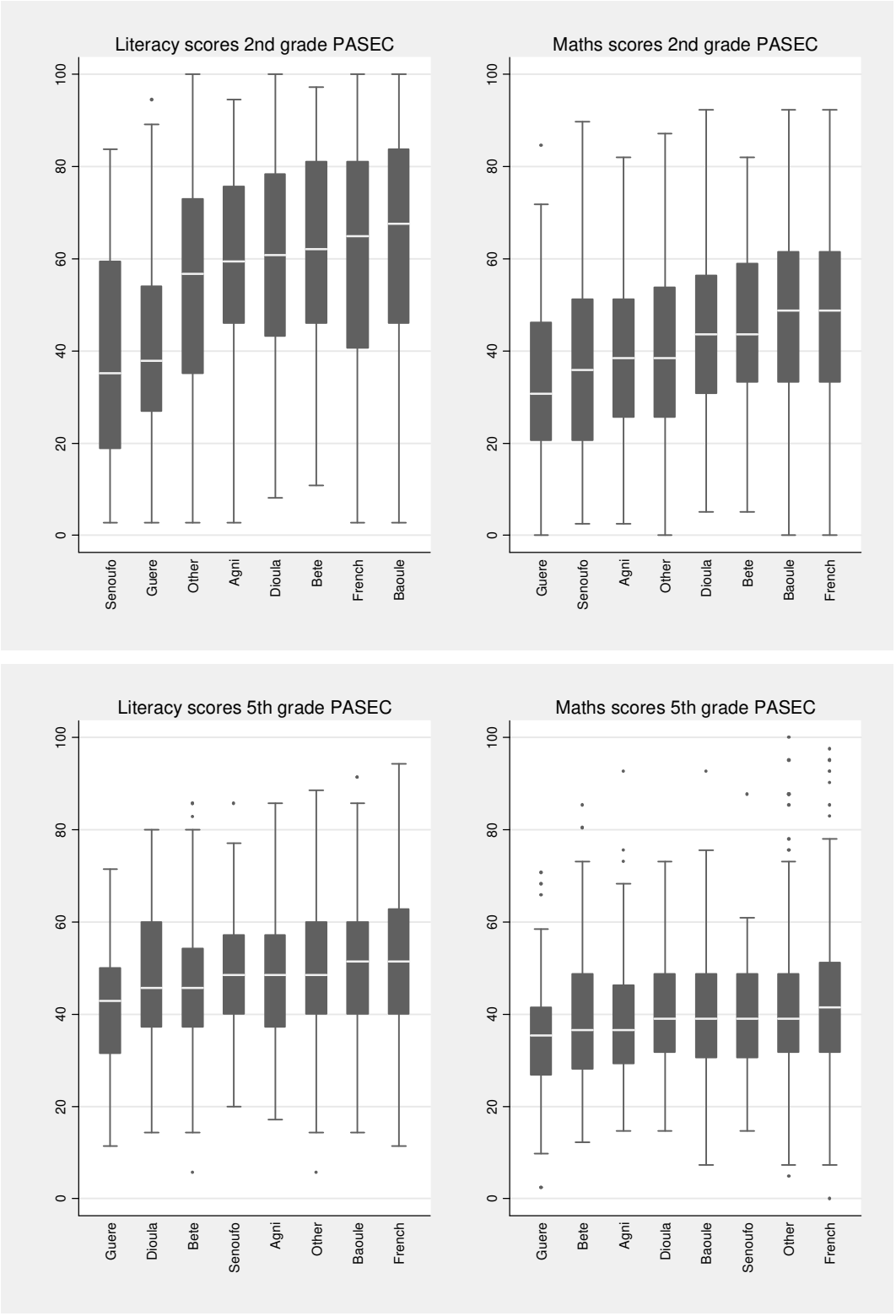


Figure A4.4: Senegal

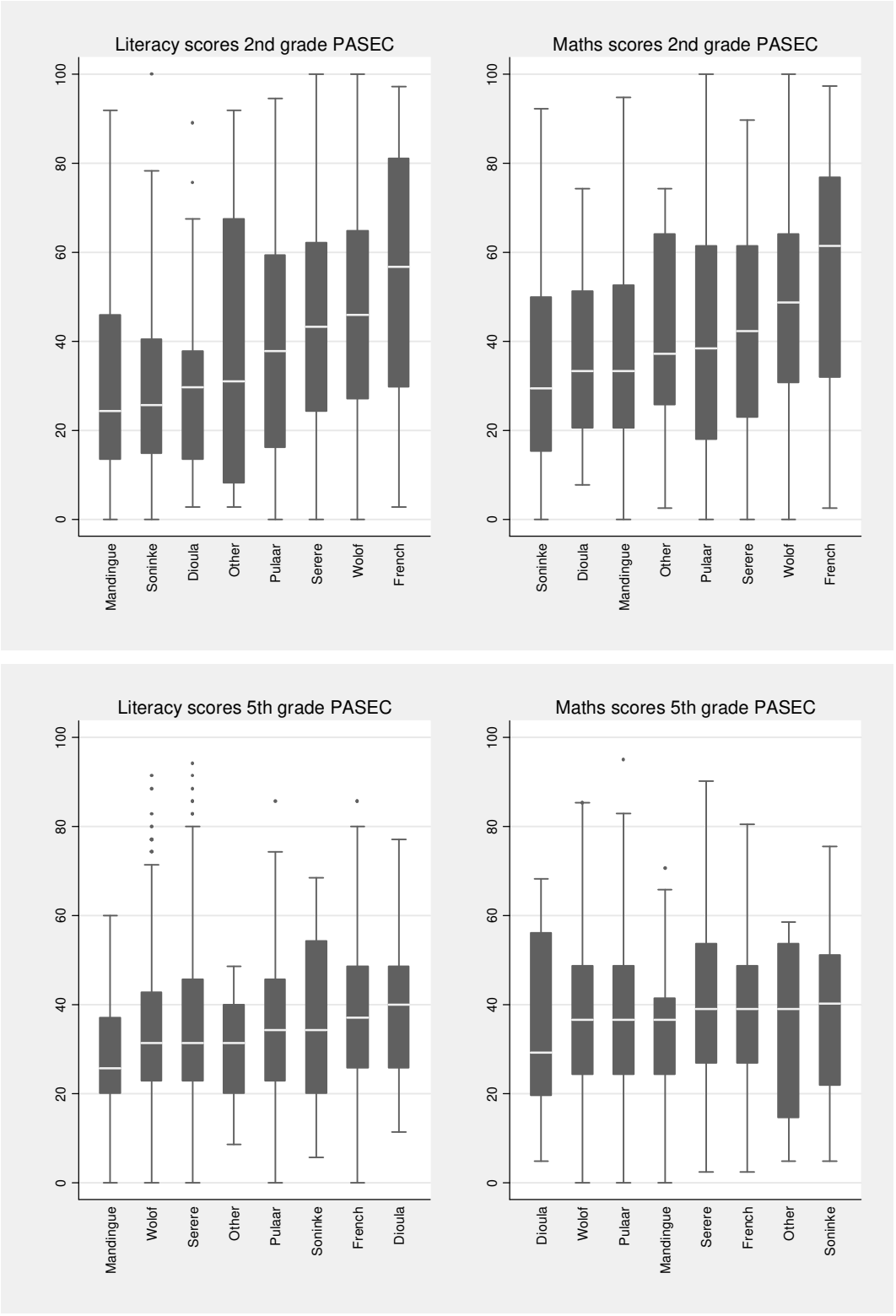


Table A4.1: Language groups in Burkina Faso(BF), Cameroon (CM), Cote d'Ivoire (CI) and Senegal (SN), grade 2

BF	N	%	**CM**	N	%	**CI**	N	%	**SN**	N	%
More	1113	47.12	Ewondo	499	16.5	Dioula	214	9.49	Dioula	34	1.84
Dioula	321	13.59	Fulfulde	69	2.28	Baoule	389	17.25	Wolof	961	52
Peul	30	1.27	Bassa	124	4.1	Senoufo	75	3.33	Pulaar	332	17.97
Gourounsi	82	3.47	Bamileke	318	10.51	Guere	138	6.12	Serere	257	13.91
Bissa	75	3.18	Maka	28	0.93	Bete	98	4.35	Soninke	29	1.57
Gourmantchi	87	3.68	Arab	40	1.32	Agni	88	3.9	Mandingue	115	6.22
French	483	20.45	Douala	38	1.26	French	867	38.45	French	98	5.3
Other	171	7.24	French	1532	50.64	Other	386	17.12	Other	22	1.19
		47.12	English	25	0.83						
			Other	352	11.64						

Table A4.2: Language groups in Burkina Faso(BF), Cameroon (CM), Cote d'Ivoire (CI) and Senegal (SN), grade 5

BF	N	%	**CM**	N	%	**CI**	N	%	**SN**	N	%
More	975	41.42	Ewondo	553	18.15	Dioula	158	7.22	Dioula	13	0.75
Dioula	199	8.45	Fulfulde	35	1.15	Baoule	337	15.4	Wolof	842	48.31
Peul	28	1.19	Bassa	130	4.27	Senoufo	86	3.93	Pulaar	260	14.92
Gourounsi	54	2.29	Bamileke	265	8.7	Guere	106	4.84	Serere	242	13.88
Bissa	68	2.89	Maka	53	1.74	Bete	130	5.94	Soninke	25	1.43
Gourmantchi	83	3.53	Arab	63	2.07	Agni	113	5.16	Mandingue	75	4.3
French	776	32.97	Douala	42	1.38	French	879	40.17	French	274	15.72
Other	171	7.26	French	1730	56.78	Other	379	17.32	Other	12	0.69
			English	33	1.08						
			Other	143	4.69						

Notes:

In Madagascar, there is only one predominant local language so that Madagascar is not considered here.

Data in Annex 4 includes only the first survey for Cameroon.

Annex 5: Weak student characteristics

Table A5.1: Weak versus median and strong performers and their characteristics, PASEC countries, literacy, 2nd grade

		Percentage of students' households with																			
		fridge		car		tv		radio		water toilet		electricity		tap		sum of items (0-7)		speaks French at home		male	
Burkina Faso	lowest 10%	**0.09**	*0.02*	**0.09**	*0.02*	**0.09**	*0.02*	**0.66**	*0.04*	**0.04**	*0.01*	**0.18**	*0.04*	**0.11**	*0.03*	**0.14**	*1.04*	**0.15**	*0.04*	**0.53**	*0.04*
	middle 10%	**0.18**	*0.04*	**0.15**	*0.04*	**0.15**	*0.04*	**0.78**	*0.03*	**0.09**	*0.02*	**0.36**	*0.05*	**0.22**	*0.04*	**2.04**	*0.21*	**0.23**	*0.04*	**0.57**	*0.04*
	highest 10%	**0.23**	*0.04*	**0.17**	*0.03*	**0.17**	*0.03*	**0.78**	*0.04*	**0.15**	*0.03*	**0.45**	*0.05*	**0.35**	*0.06*	**2.46**	*0.25*	**0.33**	*0.06*	**0.46**	*0.04*
Cote d'Ivoire	lowest 10%	**0.30**	*0.04*	**0.16**	*0.03*	**0.16**	*0.03*	**0.69**	*0.03*	**0.15**	*0.03*	**0.53**	*0.05*	**0.30**	*0.05*	**2.48**	*0.21*	**0.34**	*0.04*	**0.58**	*0.03*
	middle 10%	**0.25**	*0.03*	**0.13**	*0.02*	**0.13**	*0.02*	**0.65**	*0.03*	**0.14**	*0.02*	**0.49**	*0.05*	**0.32**	*0.04*	**2.39**	*0.18*	**0.33**	*0.04*	**0.59**	*0.03*
	highest 10%	**0.36**	*0.06*	**0.16**	*0.05*	**0.16**	*0.05*	**0.79**	*0.04*	**0.34**	*0.07*	**0.58**	*0.07*	**0.46**	*0.07*	**3.17**	*0.37*	**0.56**	*0.05*	**0.56**	*0.04*
Cameroon	lowest 10%	**0.21**	*0.04*	**0.22**	*0.04*	**0.22**	*0.04*	**0.73**	*0.04*	**0.22**	*0.04*	**0.64**	*0.06*	**0.24**	*0.04*	**2.57**	*0.23*	**0.34**	*0.06*	**0.45**	*0.04*
	middle 10%	**0.36**	*0.04*	**0.25**	*0.03*	**0.25**	*0.03*	**0.71**	*0.03*	**0.29**	*0.04*	**0.61**	*0.05*	**0.34**	*0.04*	**2.98**	*0.23*	**0.45**	*0.04*	**0.48**	*0.03*
	highest 10%	**0.54**	*0.07*	**0.43**	*0.07*	**0.43**	*0.07*	**0.81**	*0.05*	**0.44**	*0.08*	**0.78**	*0.05*	**0.62**	*0.07*	**4.27**	*0.39*	**0.49**	*0.08*	**0.49**	*0.03*
Madagascar	lowest 10%	**0.07**	*0.03*	**0.07**	*0.02*	**0.07**	*0.02*	**0.55**	*0.05*	**0.31**	*0.06*	**0.15**	*0.03*	**0.11**	*0.03*	**1.39**	*0.13*	**0.06**	*0.02*	**0.50**	*0.03*
	middle 10%	**0.12**	*0.02*	**0.09**	*0.02*	**0.09**	*0.02*	**0.64**	*0.05*	**0.19**	*0.04*	**0.32**	*0.04*	**0.14**	*0.03*	**1.66**	*0.12*	**0.05**	*0.02*	**0.45**	*0.04*
	highest 10%	**0.25**	*0.06*	**0.18**	*0.07*	**0.18**	*0.07*	**0.62**	*0.10*	**0.25**	*0.09*	**0.41**	*0.10*	**0.33**	*0.09*	**2.42**	*0.52*	**0.11**	*0.04*	**0.45**	*0.04*
Senegal	lowest 10%	**0.22**	*0.04*	**0.17**	*0.04*	**0.17**	*0.04*	**0.79**	*0.03*	**0.35**	*0.07*	**0.41**	*0.07*	**0.36**	*0.06*	**2.63**	*0.30*	**0.02**	*0.01*	**0.54**	*0.04*
	middle 10%	**0.31**	*0.05*	**0.14**	*0.03*	**0.14**	*0.03*	**0.89**	*0.03*	**0.41**	*0.06*	**0.57**	*0.06*	**0.57**	*0.06*	**3.36**	*0.24*	**0.06**	*0.02*	**0.53**	*0.04*
	highest 10%	**0.54**	*0.07*	**0.19**	*0.03*	**0.19**	*0.03*	**0.92**	*0.02*	**0.46**	*0.06*	**0.74**	*0.05*	**0.67**	*0.07*	**4.16**	*0.30*	**0.15**	*0.03*	**0.58**	*0.04*
Niger	lowest 10%	**0.21**	*0.03*	**0.23**	*0.03*	**0.23**	*0.03*	**0.79**	*0.03*	**0.19**	*0.04*	**0.45**	*0.05*	**0.26**	*0.04*	**2.50**	*0.20*	**0.06**	*0.03*	**0.52**	*0.04*
	middle 10%	**0.11**	*0.03*	**0.11**	*0.03*	**0.11**	*0.03*	**0.70**	*0.04*	**0.14**	*0.04*	**0.22**	*0.04*	**0.16**	*0.04*	**1.69**	*0.18*	**0.07**	*0.03*	**0.52**	*0.04*
	highest 10%	**0.33**	*0.05*	**0.22**	*0.04*	**0.22**	*0.04*	**0.85**	*0.04*	**0.25**	*0.06*	**0.43**	*0.07*	**0.45**	*0.06*	**2.97**	*0.31*	**0.04**	*0.02*	**0.47**	*0.06*
Mali	lowest 10%	**0.16**	*0.03*	**0.21**	*0.03*	**0.21**	*0.03*	**0.96**	*0.02*	**0.13**	*0.03*	**0.24**	*0.04*	**0.25**	*0.05*	**2.35**	*0.20*	**0.11**	*0.04*	**0.43**	*0.04*
	middle 10%	**0.19**	*0.02*	**0.19**	*0.02*	**0.19**	*0.02*	**0.92**	*0.02*	**0.17**	*0.04*	**0.32**	*0.04*	**0.20**	*0.03*	**2.43**	*0.13*	**0.15**	*0.04*	**0.50**	*0.03*
	highest 10%	**0.23**	*0.04*	**0.19**	*0.03*	**0.19**	*0.03*	**0.92**	*0.02*	**0.13**	*0.04*	**0.36**	*0.04*	**0.27**	*0.06*	**2.61**	*0.17*	**0.16**	*0.05*	**0.36**	*0.04*
Togo	lowest 10%	**0.13**	*0.05*	**0.16**	*0.04*	**0.16**	*0.04*	**0.69**	*0.04*	**0.16**	*0.04*	**0.27**	*0.05*	**0.13**	*0.03*	**1.76**	*0.19*	**0.31**	*0.05*	**0.49**	*0.05*
	middle 10%	**0.17**	*0.04*	**0.19**	*0.04*	**0.19**	*0.04*	**0.67**	*0.05*	**0.18**	*0.03*	**0.37**	*0.05*	**0.20**	*0.04*	**2.09**	*0.19*	**0.40**	*0.04*	**0.50**	*0.04*
	highest 10%	**0.26**	*0.07*	**0.24**	*0.05*	**0.24**	*0.05*	**0.73**	*0.07*	**0.15**	*0.05*	**0.30**	*0.08*	**0.27**	*0.07*	**2.32**	*0.38*	**0.76**	*0.06*	**0.45**	*0.07*

Note: Standard error of the mean in italics.

Table A5.2: Weak versus median and strong performers and their characteristics, PASEC countries, literacy, 5th grade

		Percentage of students' households with																			
		fridge		car		tv		radio		water toilet		electricity		tap		sum of items (0-7)		literacy parents (0-2)		speaks French at home		male	
Burkina Faso	lowest 10%	**0.09**	*0.02*	**0.09**	*0.02*	**0.15**	*0.03*	**0.04**	*0.65*	**0.07**	*0.02*	**0.18**	*0.04*	**0.13**	*0.03*	**1.43**	*0.15*	**0.63**	*0.06*	**0.28**	*0.04*	**0.51**	*0.03*
	middle 10%	**0.14**	*0.02*	**0.09**	*0.02*	**0.20**	*0.03*	**0.81**	*0.03*	**0.11**	*0.02*	**0.28**	*0.03*	**0.21**	*0.03*	**1.83**	*0.12*	**0.84**	*0.05*	**0.27**	*0.03*	**0.52**	*0.03*
	highest 10%	**0.29**	*0.04*	**0.17**	*0.04*	**0.45**	*0.06*	**0.85**	*0.03*	**0.24**	*0.04*	**0.49**	*0.06*	**0.34**	*0.07*	**2.84**	*0.28*	**1.19**	*0.08*	**0.58**	*0.07*	**0.54**	*0.04*
Cote d'Ivoire	lowest 10%	**0.19**	*0.03*	**0.12**	*0.02*	**0.32**	*0.03*	**0.71**	*0.03*	**0.11**	*0.02*	**0.40**	*0.05*	**0.20**	*0.04*	**2.05**	*0.14*	**0.90**	*0.06*	**0.35**	*0.04*	**0.58**	*0.04*
	middle 10%	**0.27**	*0.03*	**0.15**	*0.02*	**0.47**	*0.04*	**0.79**	*0.02*	**0.19**	*0.03*	**0.54**	*0.04*	**0.36**	*0.04*	**2.78**	*0.17*	**1.13**	*0.05*	**0.40**	*0.04*	**0.58**	*0.03*
	highest 10%	**0.49**	*0.06*	**0.27**	*0.05*	**0.69**	*0.05*	**0.90**	*0.03*	**0.45**	*0.05*	**0.79**	*0.05*	**0.60**	*0.06*	**4.18**	*0.29*	**1.44**	*0.09*	**0.48**	*0.05*	**0.53**	*0.04*
Cameroon	lowest 10%	**0.29**	*0.04*	**0.22**	*0.03*	**0.40**	*0.05*	**0.76**	*0.03*	**0.23**	*0.03*	**0.59**	*0.04*	**0.21**	*0.03*	**2.69**	*0.18*	**1.58**	*0.06*	**0.38**	*0.05*	**0.50**	*0.03*
	middle 10%	**0.36**	*0.04*	**0.26**	*0.03*	**0.48**	*0.04*	**0.80**	*0.03*	**0.29**	*0.03*	**0.63**	*0.04*	**0.35**	*0.04*	**3.18**	*0.18*	**1.70**	*0.04*	**0.46**	*0.05*	**0.44**	*0.03*
	highest 10%	**0.64**	*0.07*	**0.51**	*0.07*	**0.75**	*0.06*	**0.89**	*0.02*	**0.50**	*0.07*	**0.78**	*0.07*	**0.65**	*0.07*	**4.72**	*0.39*	**1.84**	*0.06*	**0.53**	*0.07*	**0.48**	*0.04*
Madagascar	lowest 10%	**0.09**	*0.02*	**0.10**	*0.02*	**0.19**	*0.03*	**0.80**	*0.02*	**0.17**	*0.03*	**0.03**	*0.01*	**0.16**	*0.03*	**1.55**	*0.11*	**1.73**	*0.05*	**0.05**	*0.02*	**0.51**	*0.03*
	middle 10%	**0.12**	*0.02*	**0.13**	*0.02*	**0.29**	*0.03*	**0.88**	*0.02*	**0.20**	*0.02*	**0.02**	*0.01*	**0.23**	*0.03*	**1.86**	*0.09*	**1.71**	*0.04*	**0.11**	*0.02*	**0.45**	*0.03*
	highest 10%	**0.26**	*0.08*	**0.22**	*0.06*	**0.41**	*0.09*	**0.85**	*0.04*	**0.33**	*0.06*	**0.03**	*0.01*	**0.36**	*0.08*	**2.47**	*0.34*	**1.74**	*0.07*	**0.16**	*0.05*	**0.43**	*0.03*
Senegal	lowest 10%	**0.32**	*0.05*	**0.25**	*0.04*	**0.49**	*0.06*	**0.88**	*0.03*	**0.37**	*0.07*	**0.53**	*0.06*	**0.57**	*0.07*	**3.41**	*0.27*	**1.03**	*0.08*	**0.10**	*0.03*	**0.46**	*0.05*
	middle 10%	**0.43**	*0.05*	**0.28**	*0.04*	**0.62**	*0.06*	**0.86**	*0.03*	**0.48**	*0.06*	**0.59**	*0.06*	**0.60**	*0.06*	**3.86**	*0.27*	**1.30**	*0.08*	**0.13**	*0.05*	**0.59**	*0.05*
	highest 10%	**0.53**	*0.06*	**0.28**	*0.05*	**0.64**	*0.07*	**0.91**	*0.02*	**0.46**	*0.08*	**0.64**	*0.07*	**0.59**	*0.08*	**4.07**	*0.38*	**1.30**	*0.08*	**0.20**	*0.05*	**0.52**	*0.04*
Niger	lowest 10%	**0.24**	*0.03*	**0.16**	*0.04*	**0.40**	*0.05*	**0.84**	*0.03*	**0.11**	*0.03*	**0.39**	*0.05*	**0.28**	*0.04*	**2.43**	*0.20*	**0.81**	*0.08*	**0.07**	*0.03*	**0.56**	*0.04*
	middle 10%	**0.19**	*0.04*	**0.13**	*0.03*	**0.35**	*0.04*	**0.82**	*0.03*	**0.19**	*0.05*	**0.35**	*0.05*	**0.31**	*0.05*	**2.33**	*0.20*	**0.91**	*0.07*	**0.06**	*0.02*	**0.60**	*0.05*
	highest 10%	**0.30**	*0.07*	**0.26**	*0.05*	**0.45**	*0.07*	**0.88**	*0.04*	**0.21**	*0.06*	**0.43**	*0.07*	**0.46**	*0.05*	**2.99**	*0.33*	**1.14**	*0.11*	**0.11**	*0.03*	**0.52**	*0.05*
Mali	lowest 10%	**0.19**	*0.03*	**0.23**	*0.03*	**0.51**	*0.05*	**0.98**	*0.01*	**0.15**	*0.03*	**0.33**	*0.05*	**0.31**	*0.05*	**2.71**	*0.19*	**0.88**	*0.07*	**0.27**	*0.05*	**0.49**	*0.04*
	middle 10%	**0.21**	*0.04*	**0.20**	*0.04*	**0.49**	*0.04*	**0.97**	*0.01*	**0.17**	*0.04*	**0.30**	*0.04*	**0.19**	*0.03*	**2.52**	*0.17*	**0.78**	*0.07*	**0.22**	*0.04*	**0.40**	*0.04*
	highest 10%	**0.17**	*0.05*	**0.13**	*0.03*	**0.41**	*0.06*	**0.92**	*0.03*	**0.14**	*0.04*	**0.32**	*0.07*	**0.17**	*0.06*	**2.27**	*0.26*	**0.85**	*0.09*	**0.18**	*0.04*	**0.36**	*0.04*
Togo	lowest 10%	**0.09**	*0.02*	**0.19**	*0.03*	**0.22**	*0.04*	**0.82**	*0.04*	**0.11**	*0.03*	**0.25**	*0.04*	**0.13**	*0.03*	**1.81**	*0.15*	**0.89**	*0.08*	**0.77**	*0.04*	**0.53**	*0.04*
	middle 10%	**0.14**	*0.03*	**0.17**	*0.03*	**0.32**	*0.04*	**0.88**	*0.03*	**0.07**	*0.02*	**0.29**	*0.04*	**0.16**	*0.03*	**2.03**	*0.14*	**1.10**	*0.07*	**0.79**	*0.03*	**0.63**	*0.04*
	highest 10%	**0.46**	*0.06*	**0.38**	*0.05*	**0.69**	*0.06*	**0.93**	*0.02*	**0.41**	*0.06*	**0.65**	*0.05*	**0.50**	*0.06*	**4.02**	*0.32*	**1.56**	*0.09*	**0.92**	*0.03*	**0.50**	*0.05*

Note: Standard error of the mean in italics.

Table A5.3: Weak versus median and strong performers and their characteristics, PASEC countries, mathematics, 2nd grade

		Percentage of students' households with																	
		fridge		car		tv		radio		water toilet		electricity		tap		sum of items (0-7)		speaks French at home		male	
Burkina Faso	lowest 10%	**0.08**	*0.02*	**0.02**	*0.03*	**0.03**	*0.07*	**0.04**	*0.53*	**0.05**	*0.02*	**0.13**	*0.03*	**0.02**	*0.03*	**0.13**	*0.88*	**0.15**	*0.04*	**0.55**	*0.04*
	middle 10%	**0.15**	*0.02*	**0.14**	*0.02*	**0.23**	*0.03*	**0.75**	*0.03*	**0.06**	*0.02*	**0.31**	*0.04*	**0.20**	*0.03*	**1.84**	*0.15*	**0.21**	*0.03*	**0.54**	*0.03*
	highest 10%	**0.19**	*0.04*	**0.15**	*0.03*	**0.33**	*0.05*	**0.78**	*0.04*	**0.11**	*0.03*	**0.38**	*0.05*	**0.28**	*0.05*	**2.21**	*0.21*	**0.33**	*0.05*	**0.58**	*0.04*
Cote d'Ivoire	lowest 10%	**0.24**	*0.04*	**0.11**	*0.03*	**0.34**	*0.05*	**0.62**	*0.04*	**0.12**	*0.03*	**0.43**	*0.06*	**0.30**	*0.05*	**2.17**	*0.24*	**0.30**	*0.04*	**0.53**	*0.04*
	middle 10%	**0.23**	*0.03*	**0.14**	*0.03*	**0.36**	*0.04*	**0.63**	*0.03*	**0.19**	*0.03*	**0.50**	*0.04*	**0.33**	*0.04*	**2.39**	*0.18*	**0.42**	*0.04*	**0.53**	*0.03*
	highest 10%	**0.42**	*0.06*	**0.25**	*0.06*	**0.51**	*0.06*	**0.80**	*0.04*	**0.31**	*0.07*	**0.60**	*0.06*	**0.49**	*0.07*	**3.38**	*0.36*	**0.44**	*0.06*	**0.61**	*0.04*
Cameroon	lowest 10%	**0.25**	*0.04*	**0.25**	*0.03*	**0.34**	*0.05*	**0.71**	*0.03*	**0.20**	*0.03*	**0.59**	*0.04*	**0.23**	*0.04*	**2.58**	*0.19*	**0.30**	*0.05*	**0.51**	*0.03*
	middle 10%	**0.37**	*0.04*	**0.29**	*0.03*	**0.44**	*0.04*	**0.77**	*0.03*	**0.31**	*0.04*	**0.63**	*0.04*	**0.37**	*0.04*	**3.19**	*0.20*	**0.42**	*0.04*	**0.43**	*0.03*
	highest 10%	**0.47**	*0.08*	**0.38**	*0.06*	**0.54**	*0.07*	**0.74**	*0.05*	**0.41**	*0.08*	**0.72**	*0.06*	**0.51**	*0.08*	**3.77**	*0.45*	**0.50**	*0.06*	**0.53**	*0.04*
Madagascar	lowest 10%	**0.09**	*0.02*	**0.09**	*0.02*	**0.13**	*0.03*	**0.59**	*0.04*	**0.20**	*0.04*	**0.20**	*0.03*	**0.14**	*0.03*	**1.45**	*0.11*	**0.06**	*0.02*	**0.55**	*0.04*
	middle 10%	**0.13**	*0.02*	**0.13**	*0.03*	**0.21**	*0.03*	**0.68**	*0.04*	**0.22**	*0.03*	**0.33**	*0.04*	**0.18**	*0.03*	**1.87**	*0.13*	**0.07**	*0.02*	**0.46**	*0.03*
	highest 10%	**0.14**	*0.03*	**0.09**	*0.03*	**0.30**	*0.05*	**0.64**	*0.06*	**0.18**	*0.05*	**0.35**	*0.07*	**0.28**	*0.06*	**1.98**	*0.24*	**0.12**	*0.04*	**0.45**	*0.04*
Senegal	lowest 10%	**0.19**	*0.05*	**0.12**	*0.04*	**0.29**	*0.06*	**0.75**	*0.04*	**0.27**	*0.07*	**0.35**	*0.08*	**0.29**	*0.06*	**2.25**	*0.33*	**0.01**	*0.01*	**0.48**	*0.06*
	middle 10%	**0.32**	*0.04*	**0.17**	*0.03*	**0.48**	*0.04*	**0.87**	*0.02*	**0.42**	*0.05*	**0.59**	*0.05*	**0.58**	*0.05*	**3.44**	*0.22*	**0.04**	*0.01*	**0.54**	*0.03*
	highest 10%	**0.56**	*0.06*	**0.20**	*0.04*	**0.67**	*0.06*	**0.89**	*0.03*	**0.56**	*0.06*	**0.73**	*0.05*	**0.69**	*0.06*	**4.31**	*0.30*	**0.14**	*0.04*	**0.65**	*0.05*
Niger	lowest 10%	**0.12**	*0.03*	**0.16**	*0.04*	**0.23**	*0.05*	**0.73**	*0.05*	**0.15**	*0.04*	**0.29**	*0.05*	**0.18**	*0.04*	**1.86**	*0.21*	**0.06**	*0.03*	**0.45**	*0.05*
	middle 10%	**0.20**	*0.04*	**0.16**	*0.03*	**0.30**	*0.05*	**0.73**	*0.04*	**0.19**	*0.04*	**0.34**	*0.05*	**0.23**	*0.04*	**2.15**	*0.22*	**0.05**	*0.02*	**0.55**	*0.04*
	highest 10%	**0.32**	*0.05*	**0.26**	*0.05*	**0.46**	*0.07*	**0.83**	*0.03*	**0.39**	*0.07*	**0.46**	*0.07*	**0.43**	*0.06*	**3.15**	*0.30*	**0.06**	*0.02*	**0.58**	*0.05*
Mali	lowest 10%	**0.15**	*0.03*	**0.15**	*0.03*	**0.36**	*0.05*	**0.95**	*0.02*	**0.12**	*0.03*	**0.21**	*0.04*	**0.20**	*0.04*	**2.14**	*0.19*	**0.08**	*0.04*	**0.50**	*0.04*
	middle 10%	**0.23**	*0.03*	**0.25**	*0.03*	**0.48**	*0.04*	**0.94**	*0.02*	**0.12**	*0.02*	**0.39**	*0.04*	**0.24**	*0.04*	**2.66**	*0.15*	**0.14**	*0.03*	**0.50**	*0.04*
	highest 10%	**0.27**	*0.05*	**0.19**	*0.04*	**0.51**	*0.05*	**0.96**	*0.02*	**0.13**	*0.03*	**0.39**	*0.05*	**0.25**	*0.05*	**2.69**	*0.21*	**0.14**	*0.05*	**0.40**	*0.05*
Togo	lowest 10%	**0.14**	*0.04*	**0.16**	*0.04*	**0.24**	*0.05*	**0.63**	*0.05*	**0.17**	*0.03*	**0.30**	*0.05*	**0.15**	*0.03*	**1.79**	*0.19*	**0.32**	*0.05*	**0.39**	*0.05*
	middle 10%	**0.16**	*0.03*	**0.22**	*0.03*	**0.32**	*0.04*	**0.74**	*0.04*	**0.15**	*0.03*	**0.35**	*0.04*	**0.21**	*0.04*	**2.16**	*0.19*	**0.43**	*0.05*	**0.58**	*0.03*
	highest 10%	**0.22**	*0.06*	**0.17**	*0.04*	**0.22**	*0.04*	**0.69**	*0.06*	**0.12**	*0.04*	**0.31**	*0.06*	**0.17**	*0.04*	**1.90**	*0.24*	**0.59**	*0.07*	**0.53**	*0.06*

Note: Standard error of the mean in italics.

Table A5.4: Weak versus median and strong performers and their characteristics, PASEC countries, mathematics, 5th grade

		Percentage of students' households with																			
		fridge		car		tv		radio		water toilet		electricity		tap		sum of items (0-7)		literacy parents (0-2)		speaks French at home		male	
Burkina Faso	lowest 10%	**0.11**	*0.02*	**0.10**	*0.02*	**0.03**	*0.10*	**0.75**	*0.03*	**0.02**	*0.05*	**0.21**	*0.04*	**0.15**	*0.03*	**1.57**	*0.15*	**0.73**	*0.06*	**0.04**	*0.21*	**0.50**	*0.03*
	middle 10%	**0.14**	*0.02*	**0.12**	*0.02*	**0.24**	*0.03*	**0.79**	*0.03*	**0.13**	*0.02*	**0.27**	*0.04*	**0.19**	*0.03*	**1.86**	*0.15*	**0.89**	*0.06*	**0.32**	*0.04*	**0.53**	*0.03*
	highest 10%	**0.25**	*0.04*	**0.15**	*0.03*	**0.35**	*0.05*	**0.85**	*0.03*	**0.20**	*0.04*	**0.40**	*0.06*	**0.28**	*0.05*	**2.47**	*0.25*	**1.05**	*0.08*	**0.51**	*0.06*	**0.67**	*0.03*
Cote d'Ivoire	lowest 10%	**0.24**	*0.03*	**0.15**	*0.02*	**0.37**	*0.04*	**0.71**	*0.03*	**0.15**	*0.03*	**0.45**	*0.05*	**0.26**	*0.05*	**2.33**	*0.19*	**1.04**	*0.06*	**0.36**	*0.04*	**0.55**	*0.03*
	middle 10%	**0.31**	*0.03*	**0.18**	*0.03*	**0.52**	*0.04*	**0.76**	*0.03*	**0.24**	*0.03*	**0.62**	*0.04*	**0.43**	*0.04*	**3.07**	*0.18*	**1.09**	*0.06*	**0.39**	*0.04*	**0.63**	*0.03*
	highest 10%	**0.37**	*0.05*	**0.19**	*0.03*	**0.55**	*0.07*	**0.80**	*0.04*	**0.32**	*0.05*	**0.66**	*0.07*	**0.47**	*0.06*	**3.36**	*0.34*	**1.28**	*0.08*	**0.45**	*0.06*	**0.59**	*0.03*
Cameroon	lowest 10%	**0.39**	*0.05*	**0.30**	*0.04*	**0.47**	*0.06*	**0.80**	*0.04*	**0.31**	*0.04*	**0.70**	*0.05*	**0.33**	*0.04*	**3.30**	*0.25*	**1.64**	*0.07*	**0.35**	*0.06*	**0.41**	*0.03*
	middle 10%	**0.41**	*0.04*	**0.28**	*0.03*	**0.55**	*0.04*	**0.82**	*0.03*	**0.27**	*0.04*	**0.63**	*0.04*	**0.39**	*0.05*	**3.34**	*0.21*	**1.71**	*0.04*	**0.49**	*0.05*	**0.50**	*0.04*
	highest 10%	**0.52**	*0.08*	**0.40**	*0.07*	**0.61**	*0.07*	**0.86**	*0.04*	**0.40**	*0.08*	**0.69**	*0.06*	**0.47**	*0.08*	**3.95**	*0.41*	**1.81**	*0.05*	**0.46**	*0.08*	**0.48**	*0.04*
Madagascar	lowest 10%	**0.13**	*0.03*	**0.13**	*0.03*	**0.25**	*0.04*	**0.77**	*0.03*	**0.26**	*0.04*	**0.03**	*0.01*	**0.22**	*0.03*	**1.79**	*0.13*	**1.70**	*0.04*	**0.09**	*0.03*	**0.47**	*0.03*
	middle 10%	**0.12**	*0.03*	**0.14**	*0.03*	**0.35**	*0.04*	**0.85**	*0.04*	**0.22**	*0.04*	**0.06**	*0.03*	**0.26**	*0.04*	**2.01**	*0.13*	**1.66**	*0.06*	**0.12**	*0.04*	**0.39**	*0.04*
	highest 10%	**0.18**	*0.05*	**0.17**	*0.04*	**0.33**	*0.06*	**0.88**	*0.03*	**0.27**	*0.04*	**0.03**	*0.02*	**0.24**	*0.04*	**2.09**	*0.20*	**1.84**	*0.03*	**0.12**	*0.04*	**0.46**	*0.04*
Senegal	lowest 10%	**0.35**	*0.04*	**0.24**	*0.03*	**0.57**	*0.05*	**0.90**	*0.03*	**0.46**	*0.07*	**0.56**	*0.06*	**0.59**	*0.06*	**3.68**	*0.25*	**1.04**	*0.08*	**0.11**	*0.03*	**0.46**	*0.04*
	middle 10%	**0.42**	*0.04*	**0.26**	*0.03*	**0.65**	*0.04*	**0.91**	*0.02*	**0.42**	*0.05*	**0.63**	*0.05*	**0.63**	*0.05*	**3.92**	*0.21*	**1.24**	*0.06*	**0.14**	*0.03*	**0.54**	*0.03*
	highest 10%	**0.40**	*0.06*	**0.26**	*0.05*	**0.52**	*0.08*	**0.89**	*0.03*	**0.45**	*0.08*	**0.57**	*0.08*	**0.52**	*0.09*	**3.60**	*0.41*	**1.26**	*0.09*	**0.18**	*0.05*	**0.61**	*0.04*
Niger	lowest 10%	**0.25**	*0.03*	**0.17**	*0.03*	**0.51**	*0.05*	**0.90**	*0.03*	**0.13**	*0.03*	**0.46**	*0.06*	**0.28**	*0.05*	**2.70**	*0.19*	**0.80**	*0.06*	**0.06**	*0.02*	**0.46**	*0.06*
	middle 10%	**0.16**	*0.02*	**0.25**	*0.03*	**0.36**	*0.03*	**0.84**	*0.03*	**0.12**	*0.02*	**0.33**	*0.04*	**0.27**	*0.04*	**2.33**	*0.14*	**0.83**	*0.05*	**0.17**	*0.06*	**0.56**	*0.03*
	highest 10%	**0.36**	*0.06*	**0.28**	*0.05*	**0.54**	*0.06*	**0.85**	*0.04*	**0.21**	*0.05*	**0.50**	*0.06*	**0.47**	*0.06*	**3.23**	*0.32*	**0.96**	*0.10*	**0.08**	*0.03*	**0.54**	*0.05*
Mali	lowest 10%	**0.25**	*0.05*	**0.25**	*0.03*	**0.51**	*0.06*	**0.98**	*0.01*	**0.13**	*0.03*	**0.39**	*0.07*	**0.35**	*0.06*	**2.86**	*0.25*	**0.96**	*0.07*	**0.16**	*0.04*	**0.52**	*0.04*
	middle 10%	**0.26**	*0.03*	**0.26**	*0.03*	**0.56**	*0.04*	**0.97**	*0.01*	**0.20**	*0.03*	**0.39**	*0.04*	**0.28**	*0.04*	**2.92**	*0.16*	**0.93**	*0.06*	**0.23**	*0.04*	**0.44**	*0.03*
	highest 10%	**0.14**	*0.04*	**0.15**	*0.03*	**0.41**	*0.05*	**0.92**	*0.03*	**0.11**	*0.04*	**0.28**	*0.05*	**0.15**	*0.03*	**2.14**	*0.19*	**0.76**	*0.08*	**0.16**	*0.04*	**0.31**	*0.04*
Togo	lowest 10%	**0.09**	*0.02*	**0.15**	*0.03*	**0.16**	*0.03*	**0.79**	*0.04*	**0.14**	*0.03*	**0.22**	*0.05*	**0.15**	*0.03*	**1.69**	*0.16*	**0.79**	*0.09*	**0.79**	*0.03*	**0.54**	*0.05*
	middle 10%	**0.21**	*0.04*	**0.24**	*0.04*	**0.38**	*0.05*	**0.84**	*0.03*	**0.08**	*0.02*	**0.37**	*0.05*	**0.19**	*0.03*	**2.31**	*0.18*	**1.20**	*0.07*	**0.83**	*0.03*	**0.63**	*0.04*
	highest 10%	**0.34**	*0.07*	**0.28**	*0.05*	**0.58**	*0.07*	**0.95**	*0.02*	**0.27**	*0.07*	**0.53**	*0.07*	**0.36**	*0.06*	**3.31**	*0.34*	**1.45**	*0.09*	**0.91**	*0.03*	**0.52**	*0.06*

Note: Standard error of the mean in italics.

Table A5.5: Weak versus median and strong performers and their characteristics, SACMEQ countries, literacy

		Percentage of students' households with																			
		fridge		car		tv		radio		water		electricity		table		sum of items (0-7)		education parents		speaks English at home		male	
Botswana	lowest 10%	**0.22**	*0.03*	**0.33**	*0.03*	**0.23**	*0.03*	**0.84**	*0.02*	**0.29**	*0.03*	**0.13**	*0.03*	**0.64**	*0.04*	**2.67**	*0.10*	**5.43**	*0.17*	**0.58**	*0.03*	**0.71**	*0.03*
	middle 10%	**0.29**	*0.03*	**0.30**	*0.03*	**0.2**	*0.02*	**0.90**	*0.02*	**0.41**	*0.03*	**0.19**	*0.02*	**0.81**	*0.03*	**3.10**	*0.12*	**6.17**	*0.17*	**0.69**	*0.03*	**0.44**	*0.03*
	highest 10%	**0.68**	*0.05*	**0.53**	*0.06*	**0.67**	*0.05*	**0.92**	*0.02*	**0.75**	*0.04*	**0.64**	*0.05*	**0.89**	*0.02*	**5.08**	*0.25*	**8.96**	*0.36*	**0.93**	*0.02*	**0.45**	*0.03*
Kenya	lowest 10%	**0.01**	*0.01*	**0.10**	*0.02*	**0.15**	*0.02*	**0.81**	*0.03*	**0.17**	*0.03*	**0.04**	*0.01*	**0.73**	*0.04*	**2.02**	*0.08*	**5.97**	*0.15*	**0.74**	*0.04*	**0.53**	*0.03*
	middle 10%	**0.02**	*0.01*	**0.11**	*0.02*	**0.25**	*0.03*	**0.89**	*0.02*	**0.25**	*0.03*	**0.12**	*0.02*	**0.81**	*0.03*	**2.44**	*0.08*	**7.35**	*0.18*	**0.86**	*0.02*	**0.45**	*0.03*
	highest 10%	**0.26**	*0.07*	**0.37**	*0.07*	**0.63**	*0.06*	**0.91**	*0.03*	**0.64**	*0.05*	**0.54**	*0.07*	**0.94**	*0.02*	**4.28**	*0.28*	**9.65**	*0.29*	**0.96**	*0.02*	**0.48**	*0.04*
Lesotho	lowest 10%	**0.15**	*0.02*	**0.15**	*0.02*	**0.29**	*0.03*	**0.95**	*0.01*	**0.22**	*0.03*	**0.10**	*0.02*	**0.71**	*0.04*	**2.56**	*0.10*	**5.61**	*0.17*	**0.61**	*0.04*	**0.46**	*0.03*
	middle 10%	**0.17**	*0.02*	**0.19**	*0.02*	**0.33**	*0.03*	**0.93**	*0.02*	**0.22**	*0.03*	**0.12**	*0.02*	**0.65**	*0.04*	**2.60**	*0.11*	**6.25**	*0.13*	**0.68**	*0.03*	**0.43**	*0.03*
	highest 10%	**0.26**	*0.05*	**0.30**	*0.05*	**0.42**	*0.04*	**0.93**	*0.02*	**0.34**	*0.05*	**0.23**	*0.05*	**0.68**	*0.05*	**3.15**	*0.23*	**6.78**	*0.28*	**0.82**	*0.04*	**0.38**	*0.03*
Malawi	lowest 10%	**0.02**	*0.01*	**0.06**	*0.02*	**0.06**	*0.02*	**0.80**	*0.03*	**0.19**	*0.04*	**0.06**	*0.02*	**0.57**	*0.05*	**1.76**	*0.09*	**5.27**	*0.16*	**0.25**	*0.04*	**0.53**	*0.03*
	middle 10%	**0.05**	*0.01*	**0.06**	*0.01*	**0.1**	*0.02*	**0.84**	*0.03*	**0.23**	*0.03*	**0.11**	*0.03*	**0.62**	*0.04*	**2.01**	*0.13*	**5.67**	*0.19*	**0.44**	*0.04*	**0.53**	*0.03*
	highest 10%	**0.20**	*0.04*	**0.15**	*0.03*	**0.24**	*0.04*	**0.94**	*0.02*	**0.37**	*0.05*	**0.30**	*0.05*	**0.76**	*0.04*	**2.95**	*0.21*	**7.15**	*0.30*	**0.65**	*0.05*	**0.62**	*0.04*
Mauritius	lowest 10%	**0.72**	*0.03*	**0.20**	*0.02*	**0.91**	*0.02*	**0.92**	*0.02*	**0.89**	*0.03*	**0.98**	*0.01*	**0.91**	*0.02*	**5.53**	*0.09*	**6.94**	*0.13*	**0.42**	*0.04*	**0.62**	*0.03*
	middle 10%	**0.84**	*0.02*	**0.21**	*0.02*	**0.95**	*0.02*	**0.95**	*0.02*	**0.93**	*0.02*	**1.00**	*0.00*	**0.94**	*0.02*	**5.82**	*0.08*	**7.23**	*0.09*	**0.66**	*0.04*	**0.46**	*0.03*
	highest 10%	**0.97**	*0.01*	**0.51**	*0.04*	**0.98**	*0.01*	**0.99**	*0.01*	**0.96**	*0.02*	**1.00**	*0.00*	**0.96**	*0.02*	**6.37**	*0.07*	**9.10**	*0.16*	**0.87**	*0.03*	**0.49**	*0.03*
Mozambique	lowest 10%	**0.14**	*0.02*	**0.15**	*0.02*	**0.24**	*0.03*	**0.79**	*0.03*	**0.25**	*0.03*	**0.20**	*0.03*	**0.61**	*0.03*	**2.36**	*0.12*	**5.44**	*0.15*	**0.87**	*0.02*	**0.57**	*0.03*
	middle 10%	**0.23**	*0.03*	**0.12**	*0.03*	**0.3**	*0.04*	**0.82**	*0.02*	**0.24**	*0.03*	**0.23**	*0.03*	**0.63**	*0.03*	**2.57**	*0.14*	**5.96**	*0.18*	**0.94**	*0.01*	**0.56**	*0.03*
	highest 10%	**0.40**	*0.04*	**0.16**	*0.03*	**0.52**	*0.05*	**0.87**	*0.02*	**0.34**	*0.04*	**0.39**	*0.04*	**0.72**	*0.04*	**3.40**	*0.19*	**6.60**	*0.16*	**0.99**	*0.01*	**0.69**	*0.04*
Namibia	lowest 10%	**0.21**	*0.02*	**0.37**	*0.02*	**0.28**	*0.03*	**0.87**	*0.02*	**0.25**	*0.03*	**0.16**	*0.02*	**0.65**	*0.03*	**2.79**	*0.10*	**6.43**	*0.15*	**0.69**	*0.03*	**0.50**	*0.02*
	middle 10%	**0.20**	*0.02*	**0.40**	*0.02*	**0.31**	*0.02*	**0.92**	*0.01*	**0.25**	*0.02*	**0.19**	*0.02*	**0.71**	*0.02*	**2.99**	*0.08*	**6.40**	*0.12*	**0.78**	*0.02*	**0.51**	*0.02*
	highest 10%	**0.88**	*0.02*	**0.71**	*0.03*	**0.89**	*0.02*	**0.91**	*0.02*	**0.91**	*0.02*	**0.91**	*0.02*	**0.93**	*0.01*	**6.15**	*0.09*	**9.70**	*0.18*	**0.90**	*0.01*	**0.46**	*0.02*
Seychelles	lowest 10%	**0.84**	*0.04*	**0.35**	*0.04*	**0.9**	*0.03*	**0.95**	*0.02*	**0.87**	*0.04*	**0.98**	*0.01*	**0.95**	*0.03*	**5.85**	*0.14*	**8.22**	*0.21*	**0.60**	*0.07*	**0.73**	*0.04*
	middle 10%	**0.86**	*0.03*	**0.31**	*0.04*	**0.91**	*0.02*	**0.96**	*0.01*	**0.79**	*0.06*	**0.97**	*0.01*	**0.89**	*0.03*	**5.68**	*0.15*	**8.73**	*0.16*	**0.85**	*0.03*	**0.46**	*0.05*
	highest 10%	**1.00**	*0.00*	**0.57**	*0.06*	**0.98**	*0.01*	**0.97**	*0.01*	**0.87**	*0.04*	**1.00**	*0.00*	**0.98**	*0.01*	**6.38**	*0.11*	**9.72**	*0.24*	**0.93**	*0.02*	**0.32**	*0.04*
South Africa	lowest 10%	**0.29**	*0.04*	**0.33**	*0.03*	**0.53**	*0.04*	**0.77**	*0.04*	**0.38**	*0.04*	**0.39**	*0.04*	**0.57**	*0.04*	**3.26**	*0.20*	**6.74**	*0.18*	**0.66**	*0.04*	**0.53**	*0.03*
	middle 10%	**0.37**	*0.04*	**0.33**	*0.04*	**0.71**	*0.04*	**0.86**	*0.03*	**0.42**	*0.05*	**0.53**	*0.05*	**0.69**	*0.04*	**3.92**	*0.19*	**7.03**	*0.22*	**0.74**	*0.04*	**0.57**	*0.04*
	highest 10%	**0.96**	*0.01*	**0.79**	*0.04*	**0.97**	*0.01*	**0.94**	*0.01*	**0.86**	*0.04*	**0.95**	*0.02*	**0.95**	*0.02*	**6.42**	*0.10*	**10.24**	*0.12*	**0.97**	*0.01*	**0.38**	*0.03*

Note: Standard error of the mean in italics.

Table A5.5 cont.

		Percentage of students' households with																			
		fridge		car		tv		radio		water		electricity		table		sum of items (0-7)		education parents		speaks English at home		male	
Swaziland	lowest 10%	**0.35**	*0.03*	**0.46**	*0.03*	**0.45**	*0.03*	**0.95**	*0.01*	**0.26**	*0.04*	**0.17**	*0.03*	**0.83**	*0.03*	**3.47**	*0.13*	**6.52**	*0.20*	**0.56**	*0.03*	**0.56**	*0.02*
	middle 10%	**0.35**	*0.03*	**0.39**	*0.03*	**0.38**	*0.03*	**0.95**	*0.01*	**0.25**	*0.03*	**0.25**	*0.03*	**0.78**	*0.03*	**3.33**	*0.13*	**6.85**	*0.19*	**0.64**	*0.04*	**0.47**	*0.03*
	highest 10%	**0.66**	*0.05*	**0.55**	*0.05*	**0.69**	*0.04*	**0.97**	*0.01*	**0.63**	*0.04*	**0.64**	*0.05*	**0.90**	*0.02*	**5.06**	*0.21*	**9.21**	*0.28*	**0.84**	*0.03*	**0.43**	*0.04*
Tanzania	lowest 10%	**0.02**	*0.01*	**0.02**	*0.01*	**0.07**	*0.02*	**0.50**	*0.05*	**0.24**	*0.04*	**0.09**	*0.02*	**0.29**	*0.04*	**1.23**	*0.08*	**4.71**	*0.15*	**0.70**	*0.04*	**0.42**	*0.03*
	middle 10%	**0.04**	*0.02*	**0.05**	*0.01*	**0.09**	*0.02*	**0.63**	*0.04*	**0.29**	*0.04*	**0.17**	*0.03*	**0.56**	*0.04*	**1.83**	*0.12*	**6.31**	*0.14*	**0.93**	*0.01*	**0.47**	*0.03*
	highest 10%	**0.14**	*0.05*	**0.11**	*0.03*	**0.16**	*0.03*	**0.74**	*0.05*	**0.51**	*0.07*	**0.34**	*0.06*	**0.75**	*0.04*	**2.73**	*0.23*	**7.65**	*0.25*	**0.97**	*0.01*	**0.62**	*0.04*
Uganda	lowest 10%	**0.09**	*0.02*	**0.12**	*0.03*	**0.16**	*0.03*	**0.68**	*0.03*	**0.19**	*0.04*	**0.06**	*0.02*	**0.49**	*0.05*	**1.80**	*0.12*	**5.79**	*0.17*	**0.72**	*0.03*	**0.57**	*0.04*
	middle 10%	**0.07**	*0.02*	**0.14**	*0.03*	**0.14**	*0.03*	**0.71**	*0.04*	**0.18**	*0.03*	**0.09**	*0.02*	**0.50**	*0.04*	**1.83**	*0.12*	**6.16**	*0.19*	**0.83**	*0.03*	**0.57**	*0.03*
	highest 10%	**0.24**	*0.04*	**0.20**	*0.04*	**0.31**	*0.06*	**0.80**	*0.05*	**0.34**	*0.05*	**0.41**	*0.09*	**0.72**	*0.04*	**3.03**	*0.24*	**8.21**	*0.54*	**0.93**	*0.05*	**0.50**	*0.06*
Zambia	lowest 10%	**0.11**	*0.02*	**0.11**	*0.03*	**0.25**	*0.04*	**0.54**	*0.04*	**0.18**	*0.03*	**0.10**	*0.03*	**0.60**	*0.04*	**1.90**	*0.14*	**6.48**	*0.21*	**0.55**	*0.05*	**0.51**	*0.04*
	middle 10%	**0.10**	*0.02*	**0.07**	*0.02*	**0.31**	*0.04*	**0.65**	*0.03*	**0.22**	*0.03*	**0.19**	*0.03*	**0.64**	*0.04*	**2.18**	*0.12*	**6.93**	*0.16*	**0.71**	*0.03*	**0.53**	*0.03*
	highest 10%	**0.45**	*0.07*	**0.18**	*0.04*	**0.65**	*0.06*	**0.69**	*0.08*	**0.54**	*0.08*	**0.60**	*0.08*	**0.70**	*0.06*	**3.80**	*0.46*	**9.40**	*0.23*	**0.95**	*0.02*	**0.49**	*0.03*
Zanzibar	lowest 10%	**0.09**	*0.03*	**0.14**	*0.03*	**0.17**	*0.03*	**0.78**	*0.03*	**0.35**	*0.04*	**0.17**	*0.04*	**0.44**	*0.04*	**2.15**	*0.16*	**4.87**	*0.22*	**0.86**	*0.04*	**0.48**	*0.04*
	middle 10%	**0.17**	*0.04*	**0.11**	*0.03*	**0.3**	*0.04*	**0.89**	*0.02*	**0.49**	*0.05*	**0.26**	*0.04*	**0.49**	*0.04*	**2.70**	*0.20*	**5.72**	*0.18*	**0.99**	*0.01*	**0.41**	*0.04*
	highest 10%	**0.30**	*0.06*	**0.18**	*0.04*	**0.41**	*0.06*	**0.90**	*0.03*	**0.60**	*0.07*	**0.40**	*0.07*	**0.66**	*0.04*	**3.46**	*0.31*	**6.75**	*0.37*	**0.99**	*0.01*	**0.49**	*0.05*

Table A5.6: Weak versus median and high performers and their characteristics, SACMEQ countries, mathematics

		Percentage of students' households with																			
		fridge		car		tv		radio		water		electricity		table		sum of items (0-7)		education parents		speaks English at home		male	
Botswana	lowest 10%	**0.24**	*0.03*	**0.32**	*0.02*	**0.25**	*0.03*	**0.84**	*0.02*	**0.30**	*0.03*	**0.19**	*0.03*	**0.67**	*0.04*	**2.81**	*0.11*	**5.76**	*0.16*	**0.58**	*0.03*	**0.55**	*0.02*
	middle 10%	**0.31**	*0.03*	**0.32**	*0.02*	**0.28**	*0.02*	**0.90**	*0.01*	**0.39**	*0.03*	**0.24**	*0.02*	**0.79**	*0.02*	**3.24**	*0.10*	**6.29**	*0.16*	**0.74**	*0.02*	**0.46**	*0.02*
	highest 10%	**0.6**	*0.05*	**0.49**	*0.06*	**0.57**	*0.05*	**0.94**	*0.01*	**0.68**	*0.04*	**0.54**	*0.05*	**0.90**	*0.02*	**4.72**	*0.24*	**8.17**	*0.38*	**0.93**	*0.02*	**0.45**	*0.03*
Kenya	lowest 10%	**0.02**	*0.01*	**0.11**	*0.02*	**0.21**	*0.03*	**0.84**	*0.02*	**0.22**	*0.03*	**0.07**	*0.02*	**0.77**	*0.04*	**2.24**	*0.09*	**6.53**	*0.18*	**0.82**	*0.03*	**0.39**	*0.03*
	middle 10%	**0.04**	*0.01*	**0.14**	*0.02*	**0.27**	*0.03*	**0.87**	*0.02*	**0.28**	*0.03*	**0.17**	*0.03*	**0.82**	*0.03*	**2.59**	*0.10*	**7.34**	*0.18*	**0.85**	*0.02*	**0.48**	*0.03*
	highest 10%	**0.19**	*0.07*	**0.29**	*0.07*	**0.46**	*0.07*	**0.89**	*0.03*	**0.55**	*0.06*	**0.42**	*0.07*	**0.94**	*0.02*	**3.75**	*0.33*	**9.07**	*0.34*	**0.96**	*0.02*	**0.62**	*0.04*
Lesotho	lowest 10%	**0.18**	*0.02*	**0.16**	*0.02*	**0.30**	*0.03*	**0.96**	*0.01*	**0.27**	*0.03*	**0.15**	*0.02*	**0.76**	*0.03*	**2.78**	*0.10*	**5.79**	*0.14*	**0.57**	*0.04*	**0.46**	*0.03*
	middle 10%	**0.14**	*0.02*	**0.16**	*0.02*	**0.32**	*0.03*	**0.94**	*0.02*	**0.27**	*0.03*	**0.12**	*0.02*	**0.70**	*0.03*	**2.64**	*0.10*	**5.96**	*0.14*	**0.72**	*0.03*	**0.46**	*0.02*
	highest 10%	**0.22**	*0.06*	**0.28**	*0.04*	**0.41**	*0.05*	**0.95**	*0.02*	**0.24**	*0.05*	**0.22**	*0.05*	**0.61**	*0.06*	**2.94**	*0.22*	**6.79**	*0.23*	**0.77**	*0.04*	**0.42**	*0.03*
Malawi	lowest 10%	**0.04**	*0.01*	**0.05**	*0.01*	**0.05**	*0.02*	**0.81**	*0.04*	**0.19**	*0.03*	**0.07**	*0.02*	**0.60**	*0.05*	**1.81**	*0.12*	**5.22**	*0.17*	**0.30**	*0.03*	**0.47**	*0.03*
	middle 10%	**0.08**	*0.02*	**0.09**	*0.02*	**0.14**	*0.03*	**0.91**	*0.02*	**0.22**	*0.03*	**0.15**	*0.03*	**0.67**	*0.04*	**2.26**	*0.11*	**5.91**	*0.20*	**0.35**	*0.04*	**0.46**	*0.03*
	highest 10%	**0.19**	*0.04*	**0.18**	*0.04*	**0.24**	*0.04*	**0.90**	*0.02*	**0.36**	*0.05*	**0.31**	*0.05*	**0.70**	*0.04*	**2.90**	*0.21*	**6.99**	*0.32*	**0.61**	*0.05*	**0.67**	*0.04*
Mauritius	lowest 10%	**0.71**	*0.03*	**0.22**	*0.02*	**0.91**	*0.02*	**0.96**	*0.01*	**0.91**	*0.02*	**0.99**	*0.01*	**0.90**	*0.02*	**5.60**	*0.07*	**7.22**	*0.17*	**0.38**	*0.04*	**0.58**	*0.03*
	middle 10%	**0.86**	*0.02*	**0.20**	*0.02*	**0.96**	*0.01*	**0.96**	*0.01*	**0.94**	*0.02*	**0.99**	*0.00*	**0.94**	*0.02*	**5.86**	*0.07*	**7.38**	*0.12*	**0.65**	*0.04*	**0.51**	*0.03*
	highest 10%	**0.99**	*0.01*	**0.53**	*0.04*	**0.99**	*0.00*	**1.00**	*0.00*	**0.98**	*0.01*	**1.00**	*0.00*	**0.96**	*0.01*	**6.46**	*0.04*	**8.87**	*0.17*	**0.86**	*0.03*	**0.53**	*0.03*
Mozambique	lowest 10%	**0.19**	*0.03*	**0.14**	*0.02*	**0.25**	*0.03*	**0.79**	*0.03*	**0.25**	*0.03*	**0.18**	*0.03*	**0.58**	*0.03*	**2.37**	*0.13*	**5.73**	*0.16*	**0.87**	*0.02*	**0.49**	*0.03*
	middle 10%	**0.21**	*0.03*	**0.11**	*0.03*	**0.30**	*0.03*	**0.85**	*0.02*	**0.26**	*0.03*	**0.20**	*0.02*	**0.63**	*0.03*	**2.57**	*0.14*	**5.80**	*0.15*	**0.95**	*0.01*	**0.60**	*0.03*
	highest 10%	**0.29**	*0.04*	**0.16**	*0.02*	**0.38**	*0.04*	**0.86**	*0.03*	**0.26**	*0.03*	**0.30**	*0.03*	**0.67**	*0.04*	**2.91**	*0.17*	**6.41**	*0.19*	**1.00**	*0.00*	**0.76**	*0.04*
Namibia	lowest 10%	**0.18**	*0.02*	**0.38**	*0.02*	**0.29**	*0.03*	**0.91**	*0.01*	**0.23**	*0.02*	**0.16**	*0.02*	**0.71**	*0.03*	**2.88**	*0.09*	**6.44**	*0.14*	**0.71**	*0.03*	**0.47**	*0.02*
	middle 10%	**0.27**	*0.02*	**0.43**	*0.02*	**0.36**	*0.02*	**0.90**	*0.01*	**0.30**	*0.03*	**0.25**	*0.02*	**0.69**	*0.02*	**3.20**	*0.10*	**6.63**	*0.12*	**0.76**	*0.02*	**0.49**	*0.02*
	highest 10%	**0.84**	*0.02*	**0.74**	*0.03*	**0.86**	*0.02*	**0.91**	*0.02*	**0.88**	*0.02*	**0.89**	*0.02*	**0.91**	*0.01*	**6.02**	*0.11*	**9.55**	*0.19*	**0.87**	*0.02*	**0.53**	*0.02*
Seychelles	lowest 10%	**0.82**	*0.03*	**0.30**	*0.04*	**0.90**	*0.02*	**0.96**	*0.01*	**0.83**	*0.05*	**0.98**	*0.01*	**0.92**	*0.03*	**5.72**	*0.11*	**8.06**	*0.10*	**0.68**	*0.06*	**0.61**	*0.03*
	middle 10%	**0.85**	*0.03*	**0.34**	*0.03*	**0.93**	*0.02*	**0.95**	*0.02*	**0.78**	*0.06*	**0.99**	*0.01*	**0.93**	*0.03*	**5.76**	*0.11*	**8.45**	*0.17*	**0.84**	*0.03*	**0.49**	*0.04*
	highest 10%	**0.99**	*0.01*	**0.53**	*0.07*	**1.00**	*0.00*	**0.99**	*0.01*	**0.93**	*0.03*	**1.00**	*0.00*	**0.97**	*0.02*	**6.41**	*0.09*	**9.64**	*0.16*	**0.94**	*0.02*	**0.37**	*0.04*
South Africa	lowest 10%	**0.3**	*0.03*	**0.30**	*0.03*	**0.61**	*0.03*	**0.80**	*0.03*	**0.43**	*0.04*	**0.50**	*0.05*	**0.62**	*0.04*	**3.56**	*0.19*	**6.75**	*0.19*	**0.67**	*0.03*	**0.52**	*0.03*
	middle 10%	**0.36**	*0.03*	**0.34**	*0.03*	**0.56**	*0.03*	**0.81**	*0.03*	**0.41**	*0.04*	**0.47**	*0.04*	**0.63**	*0.04*	**3.59**	*0.18*	**6.73**	*0.21*	**0.71**	*0.04*	**0.47**	*0.03*
	highest 10%	**0.94**	*0.02*	**0.76**	*0.04*	**0.95**	*0.02*	**0.95**	*0.01*	**0.88**	*0.04*	**0.97**	*0.01*	**0.94**	*0.03*	**6.39**	*0.15*	**10.14**	*0.20*	**0.98**	*0.01*	**0.45**	*0.03*

Table A5.6 cont.

		Percentage of students' households with																			
		fridge		car		tv		radio		water		electricity		table		sum of items (0-7)		education parents		speaks English at home		male	
Swaziland	lowest 10%	**0.28**	*0.03*	**0.45**	*0.03*	**0.44**	*0.03*	**0.91**	*0.02*	**0.27**	*0.03*	**0.21**	*0.04*	**0.76**	*0.03*	**3.32**	*0.14*	**6.85**	*0.15*	**0.55**	*0.03*	**0.40**	*0.03*
	middle 10%	**0.39**	*0.03*	**0.43**	*0.02*	**0.46**	*0.03*	**0.95**	*0.01*	**0.29**	*0.03*	**0.27**	*0.03*	**0.79**	*0.02*	**3.59**	*0.11*	**7.03**	*0.17*	**0.63**	*0.03*	**0.51**	*0.02*
	highest 10%	**0.58**	*0.06*	**0.49**	*0.06*	**0.59**	*0.06*	**0.96**	*0.01*	**0.49**	*0.06*	**0.48**	*0.07*	**0.90**	*0.02*	**4.48**	*0.29*	**8.31**	*0.41*	**0.75**	*0.05*	**0.47**	*0.03*
Tanzania	lowest 10%	**0.01**	*0.01*	**0.04**	*0.01*	**0.09**	*0.02*	**0.61**	*0.04*	**0.22**	*0.03*	**0.09**	*0.02*	**0.35**	*0.04*	**1.40**	*0.09*	**5.15**	*0.17*	**0.78**	*0.03*	**0.39**	*0.03*
	middle 10%	**0.04**	*0.01*	**0.05**	*0.01*	**0.09**	*0.02*	**0.66**	*0.03*	**0.23**	*0.04*	**0.16**	*0.04*	**0.54**	*0.03*	**1.76**	*0.13*	**6.10**	*0.18*	**0.91**	*0.02*	**0.43**	*0.02*
	highest 10%	**0.11**	*0.04*	**0.12**	*0.02*	**0.17**	*0.05*	**0.76**	*0.05*	**0.51**	*0.07*	**0.30**	*0.07*	**0.73**	*0.05*	**2.70**	*0.27*	**7.19**	*0.28*	**0.97**	*0.01*	**0.68**	*0.03*
Uganda	lowest 10%	**0.08**	*0.02*	**0.14**	*0.02*	**0.14**	*0.03*	**0.71**	*0.04*	**0.15**	*0.02*	**0.11**	*0.02*	**0.51**	*0.05*	**1.83**	*0.13*	**5.83**	*0.19*	**0.72**	*0.04*	**0.48**	*0.04*
	middle 10%	**0.06**	*0.02*	**0.13**	*0.02*	**0.11**	*0.02*	**0.72**	*0.03*	**0.19**	*0.03*	**0.07**	*0.02*	**0.55**	*0.04*	**1.83**	*0.10*	**6.26**	*0.16*	**0.83**	*0.03*	**0.59**	*0.03*
	highest 10%	**0.15**	*0.04*	**0.15**	*0.04*	**0.29**	*0.10*	**0.79**	*0.07*	**0.29**	*0.06*	**0.28**	*0.07*	**0.68**	*0.06*	**2.62**	*0.33*	**7.08**	*0.46*	**0.90**	*0.05*	**0.50**	*0.07*
Zambia	lowest 10%	**0.13**	*0.02*	**0.08**	*0.02*	**0.30**	*0.04*	**0.62**	*0.04*	**0.26**	*0.04*	**0.19**	*0.03*	**0.62**	*0.04*	**2.21**	*0.16*	**7.12**	*0.18*	**0.56**	*0.04*	**0.48**	*0.03*
	middle 10%	**0.13**	*0.02*	**0.06**	*0.01*	**0.35**	*0.04*	**0.62**	*0.04*	**0.26**	*0.03*	**0.21**	*0.03*	**0.66**	*0.04*	**2.29**	*0.15*	**7.07**	*0.15*	**0.72**	*0.03*	**0.47**	*0.03*
	highest 10%	**0.39**	*0.06*	**0.17**	*0.05*	**0.62**	*0.06*	**0.75**	*0.05*	**0.49**	*0.08*	**0.48**	*0.08*	**0.74**	*0.06*	**3.64**	*0.37*	**9.15**	*0.28*	**0.94**	*0.02*	**0.62**	*0.05*
Zanzibar	lowest 10%	**0.19**	*0.04*	**0.13**	*0.03*	**0.29**	*0.04*	**0.81**	*0.03*	**0.45**	*0.05*	**0.28**	*0.04*	**0.50**	*0.04*	**2.65**	*0.19*	**5.69**	*0.23*	**0.92**	*0.02*	**0.39**	*0.03*
	middle 10%	**0.17**	*0.03*	**0.13**	*0.02*	**0.24**	*0.03*	**0.86**	*0.02*	**0.41**	*0.04*	**0.25**	*0.04*	**0.50**	*0.03*	**2.56**	*0.15*	**5.68**	*0.19*	**0.98**	*0.01*	**0.43**	*0.03*
	highest 10%	**0.2**	*0.05*	**0.13**	*0.03*	**0.25**	*0.07*	**0.91**	*0.02*	**0.47**	*0.07*	**0.31**	*0.07*	**0.63**	*0.05*	**2.90**	*0.30*	**6.33**	*0.42*	**0.99**	*0.00*	**0.61**	*0.04*

Note: Standard error of the mean in italics.

Table A5.7 Tabulation of Variables from descriptive section

	SACMEQ			PASEC	
	N	%		N	%
isolated	1912	4.6	small village	7342	17.0
rural	21708	52.4	big village	11386	26.4
small town	8871	21.4	suburb	3700	8.6
large town	8946	21.6	town	17956	41.6
0-1 Item	9171	22.0	0-1 Item	20204	47.1
2-3 Items	16193	38.9	2-3 Items	11380	26.6
4-5 Items	7622	18.3	4-5 Items	6913	16.1
6-7 Items	8700	20.9	6-7 Items	4360	10.2

Annex 6: Regression results

Table A6.1: Results from regressions without school quality variables (including country dummies)

	SACMEQ				PASEC							
	literacy	maths			literacy				maths			
	scores	scores	marginal effect on probability to achieve minimum		2	2 mit pre-test	5	5 mit pre-test	2	2 mit pre-test	5	5 n
Pupil is female	**3.86**	**-8.99**	**0.021**		0.51	**0.80**	0.10	0.36	**-1.01**	-0.49	**-0.913**	
Pupil's age in months	**-0.38**	**-0.32**	**-0.003**	in years	-0.16	**-0.52**	**-1.25348**	**-0.78**	**0.54**	-0.33	**-0.575**	
Pupil's home possessions (e.g. newspaper, tv, fridge, etc.; 0-14)	**1.03**	**1.10**	0.001	(0-8)	**0.86**	**0.48**	**0.33**	**0.25**	**0.75**	**0.44**	**0.1614**	
Pupil' housing conditions (3=bad - 16=good)	**1.20**	**0.71**	**0.010**									
Pupil's meals per day (1=none at all - 12=3> every day)	**3.83**	**3.77**	**0.022**	(0-3)	0.03	-0.78	0.49	-0.40	-0.01	-0.52	0.61	
Parental education (2=none - 12=both some post-secondary)	**2.72**	**1.74**	**0.013**	Parental literacy (0=none - 2=both are literate)			**0.84**	0.31			**0.6358**	
Number of books at pupil's home (0-250)	**0.10**	**0.09**	0.000	Pupil has some books at home (2)			**2.04**	**1.34**			**1.5556**	
Pupil speaks English at home	**29.05**	**25.64**	**0.164**	French (2)	**3.48**	**1.77**	**1.35**	0.57	**3.05**	**2.56**	**1.1279**	
Socio economic status of classmates (1-15)	**10.66**	**8.14**	**0.051**	(0-8)	**1.22**	-0.08	**1.17**	**0.68**	**1.48**	**1.19**	0.36	
School location (1=isolated-4=city)	**4.33**	1 68	**0.030**	dummy (0=rural, 1=urban)	0 97	1 13	-0 08	0 15	0 39	-0 70	0 12	

Table A6.2: Full regressions, literacy

SACMEQ	Regr. 1 English (1) grade 6 A: 2-level model		Regr. 2 English (1) grade 6 B: survey regr.		PASEC	Regr. 3 French grade 5 A: 2-level model		Regr. 4 French grade 5 B: survey regr.		Regr. 5 French grade 5 A: 2-level model		Regr. 6 French grade 5 B: survey regr.		Regr. 7 French grade 2 A: 2-level model		Regr. 8 French grade 2 B: survey regr.		Regr. 9 French grade 2 A: 2-level model		Regr. 10 French grade 2 B: survey regr.	
	Coef	P>|z|	Coef	P>|t|	Variable and Range: modifications	Coef	P>|z|	Coef	P>|t|	Coef	P>|z|	Coef	P>|t|	Coef	P> z|	Coef	P>|t|	Coef	P>|z|	Coef	P>|t|
Initial score at the beginning of term (pre-test score)										**0.43**	0.00	**0.47**	0.00					**0.49**	0.00	**0.51**	0.00
Learning materials																					
Pupil possesses a textbook for reading						**0.62**	0.03	0.42	0.15	0.28	0.26	0.10	0.70	**3.59**	0.00	**3.53**	0.00	**2.07**	0.00	**2.07**	0.00
Availability of reading book (0=none, 0,3=shared with several peers, 0,5=shared with one peer, 1=own book)	**3.89**	0.01	**6.46**	0.01	share of books among the pupil's classmates	2.32	0.16	2.53	0.12	1.39	0.33	1.29	0.35	1.12	0.65	1.07	0.67	-0.18	0.93	-0.25	0.91
Class is equipped with wall chart	1.12	0.49	1.91	0.38																	
Teacher has access to a teacher's manual for reading	**6.54**	0.00	**4.84**	0.04		0.80	0.36	0.85	0.37	0.46	0.54	0.35	0.66	1.06	0.51	0.51	0.74	0.65	0.64	0.45	0.75
School equipment																					
Condition of school building (1=needs complete rebuilding - 5=good conditions)	**1.67**	0.05	**1.87**	0.04																	
School is equipped with a library	4.13	0.07	**4.58**	0.04		-0.32	0.80	-0.37	0.76	-0.97	0.37	-0.99	0.30	**4.49**	0.03	**4.87**	0.02	1.90	0.29	2.38	0.17
School is equipped with a first aid kit	3.63	0.12	3.88	0.12	sick-room with some equipment	-0.30	0.89	-0.15	0.93	-0.23	0.90	0.01	0.99	2.40	0.55	2.08	0.60	2.17	0.53	2.37	0.30
School has access to water	-3.11	0.22	-2.08	0.40		-0.72	0.34	-0.78	0.33	-1.01	0.12	-1.05	0.14	-0.23	0.86	-0.14	0.90	-0.07	0.95	0.07	0.95
Pupil-toilet-ratio	0.00	0.98	0.00	0.80	toilets available (dummy)	0.52	0.48	0.27	0.73	0.53	0.41	0.34	0.62	0.04	0.97	0.24	0.84	0.49	0.64	0.39	0.72
School is equipped with electricity	0.52	0.85	0.23	0.93		1.14	0.23	1.06	0.20	0.05	0.95	0.20	0.78	2.97	0.07	2.79	0.08	0.49	0.72	0.09	0.95
School is equipped with technical resources: radio, tv,vcr,computer (0-4)	**14.08**	0.00	**12.72**	0.00																	
Class is equipped with library	**9.65**	0.00	3.54	0.10																	
Classroom is equipped with blackboard and chalk (or equivalent alternatives)	**-6.92**	0.01	-2.50	0.52		1.51	0.22	1.15	0.97	1.31	0.21	1.10	0.20	2.59	0.16	2.63	0.19	1.99	0.21	1.99	0.26
Teacher numbers and qualification																					
Class size	**3.98**	0.00	**0.84**	0.01		-0.09	0.15	-0.10	0.09	-0.04	0.41	-0.04	0.39	-0.12	0.18	-0.12	0.20	-0.10	0.21	-0.12	0.19
Class size squared	**-0.03**	0.00	**-0.01**	0.01		0.00	0.11	0.00	0.08	0.00	0.36	0.00	0.40	0.00	0.45	0.00	0.36	0.00	0.33	0.00	0.20
Teacher academic qualification (1=primary 5=tertiary)	**2.30**	0.00	**4.11**	0.00	(0=below primary 6=at least 3 years of tertiary)	0.03	0.93	0.03	0.93	-0.19	0.50	-0.19	0.51	-0.81	0.16	-0.73	0.18	-0.65	0.19	-0.48	0.32
Teacher professional qualification (1=no teacher training - 6=three years or more)	**2.32**	0.00	1.05	0.26	teacher has received at least some professional training (dummy)	0.64	0.52	0.73	0.44	0.19	0.82	0.18	0.82	-1.51	0.30	-1.85	0.24	-0.83	0.50	-0.89	0.27
Assessment of the efficacy of in-service training by teacher (1=no such training received - 5=very effective)	**-1.83**	0.00	**-1.55**	0.01	average number of in-service training courses per year (during the last five years) (3)	**1.07**	0.02	**1.20**	0.03	0.65	0.09	0.71	0.05	0.55	0.40	0.50	0.45	0.68	0.22	0.66	0.56
Organization of student flows and study time																					
School organization in shifts	-2.93	0.45	-5.83	0.10		**-3.79**	0.00	**-3.60**	0.01	**-3.10**	0.00	**-2.75**	0.02	-2.19	0.17	-1.21	0.43	-1.30	0.34	-0.73	0.59
Multi-grade teaching						0.31	0.63	-0.13	0.94	0.62	0.51	0.74	0.64	-0.83	0.71	-1.03	0.61	-0.95	0.62	-1.01	0.62
Pupil repeats current grade (3)	**-11.16**	0.00	**-12.11**	0.00		**1.09**	0.00	0.62	0.13	**0.60**	0.03	0.32	0.38	**-0.96**	0.02	-0.92	0.14	**-1.38**	0.00	**-1.26**	0.01
Pupil's overall grade repetition (1=never - 4=three or more times)	**-7.67**	0.00	**-10.83**	0.00	number of grades repeated before current grade	**-2.06**	0.00	**-2.52**	0.00	**-1.39**	0.00	**-1.48**	0.00	**-4.66**	0.00	**-5.26**	0.00	**-3.28**	0.00	**-3.29**	0.00
Pupil is never missing school	**16.15**	0.00	**14.81**	0.01																	
Pupil has no health problems	-0.12	0.98	-3.92	0.45																	
Teacher arrives late (1=never - 3=often)	**-6.06**	0.01	**-5.81**	0.04																	
Teacher absenteeism (1=never - 3=often)	-3.08	0.09	-3.47	0.07	absence in days per month (0-25)	-0.23	0.08	-0.21	0.07	-0.14	0.22	-0.12	0.23	0.28	0.12	0.24	0.24	0.22	0.15	0.17	0.30
Number of lost official school days in the previous school year	0.06	0.63	0.06	0.86																	
Institutional variables																					
School type (1=government, 2=prival)	**9.60**	0.02	7.13	0.12																	
Parents' or community's contribution to class equipment of furniture, books and other materials (0=none-4)	**2.14**	0.01	**2.28**	0.01	parents easily mobilized for school issues (dummy)	0.29	0.68	0.32	0.66	-0.24	0.69	-0.29	0.65	-0.35	0.77	-0.34	0.77	-0.06	0.95	-0.14	0.89
Parents' or community's payment of exam fees, additional teacher salaries or bonuses (0=none -5)	0.54	0.61	0.34	0.78																	
Teacher works on a non civil servant contract						0.74	0.50	1.32	0.25	0.26	0.78	0.55	0.59	-0.27	0.87	-0.19	0.91	-1.52	0.29	-2.04	0.18
Teacher gets advice from principal at least once a year	**-5.76**	0.02	-3.06	0.41	frequent exchange among teachers	-0.75	0.37	-0.54	0.51	-0.67	0.35	-0.47	0.50	-0.18	0.90	-0.32	0.83	0.70	0.57	0.60	0.63
Teacher considers promotion opportunities as very important	**-5.92**	0.00	-0.82	0.72																	
School inspection in the year 2000	-0.88	0.60	-2.33	0.20	in the year of the survey	1.13	0.20	1.24	0.17	0.79	0.30	0.88	0.24	-1.55	0.26	-1.84	0.16	-0.66	0.58	-0.63	0.58

Table A6.2 continued

Controls					Controls													
Student characteristics and family background																		
Pupil is female	**4.03**	0.00	**4.20**	0.00		-0.30	0.16	0.02	0.95	0.03	0.89	0.26	0.29	-0.06	0.86	0.72	0.11	0.38	0.17	**0.98**	0.01
Pupil's age in months	**-0.27**	0.00	**-0.22**	0.00	in years	**-0.76**	0.00	**-0.83**	0.00	**-0.59**	0.00	**-0.63**	0.00	**0.65**	0.00	**0.58**	0.03	-0.04	0.78	-0.02	0.94
Pupil's home possessions (e.g. newspaper, tv, fridge, etc.; 0-14)	**0.98**	0.00	**0.70**	0.01	(0-8)	**0.36**	0.00	**0.34**	0.00	**0.25**	0.00	**0.24**	0.00	**0.71**	0.00	**0.69**	0.00	**0.46**	0.00	**0.44**	0.00
Pupil' housing conditions (3=bad - 16=good)	**1.69**	0.00	**1.27**	0.00																	
Pupil's meals per day (1=none at all - 12=3x every day)	**3.43**	0.00	**3.55**	0.00	(0-3)	**1.58**	0.00	**1.57**	0.00	**0.78**	0.00	0.09	0.82	0.38	0.36	0.51	0.55	0.18	0.62	-0.35	0.63
Parental education (2=none - 12=both some post-secondary)	**2.35**	0.00	**2.67**	0.00	Parental literacy (0=none - 2=both are literate)	**0.58**	0.00	**0.74**	0.01	0.21	0.17	0.24	0.32								
Number of books at pupil's home (0 250)	**0.07**	0.00	**0.09**	0.00	Pupil has some books at home (3)	**1.60**	0.00	**2.00**	0.00	**1.04**	0.00	**1.34**	0.00								
Pupil speaks English at home	**23.86**	0.00	**27.04**	0.00	French (3)	**1.72**	0.00	**1.34**	0.03	**0.98**	0.00	0.70	0.23	**3.22**	0.00	**3.41**	0.00	**1.22**	0.00	**2.15**	0.01
Pupil gets help with homework						**-0.72**	0.00	**-1.21**	0.00	**-0.53**	0.01	**-0.91**	0.00	**1.95**	0.00	**1.63**	0.01	0.50	0.13	-0.24	0.67
Socio economic status of classmates (1-15)	**6.92**	0.00	**6.58**	0.00	(0-8)	**1.33**	0.00	**1.35**	0.00	**1.02**	0.00	**0.99**	0.00	0.44	0.39	0.65	0.21	-0.07	0.87	0.03	0.94
Teacher characteristics																					
Teacher is female	**-3.15**	0.03	0.35	0.86		0.24	0.78	0.58	0.52	0.32	0.66	0.11	0.89	0.81	0.51	0.90	0.46	0.88	0.40	1.00	0.34
Teacher job experience (in years)	**0.22**	0.01	0.19	0.19		0.09	0.09	0.09	0.12	0.07	0.11	0.07	0.16	-0.11	0.17	-0.09	0.25	-0.09	0.19	-0.07	0.32
Teacher speaks teaching language at home (3)						-0.32	0.53	-0.28	0.58	0.02	0.97	0.05	0.90	0.13	0.88	0.25	0.75	-0.07	0.92	-0.04	0.95
Teacher speaks local language						0.85	0.29	0.56	0.49	0.69	0.69	0.41	0.57	1.32	0.32	1.55	0.24	-0.17	0.88	-0.07	0.95
Pedagocial tools																					
Frequency of reading test (1=none 6=once or more per week)	**24.27**	0.00	**17.05**	0.02																	
Squared frequency of reading test	**-2.77**	0.00	**-2.07**	0.01																	
Frequency teacher corrects reading-homework (1=no homework - 6=always)	**1.62**	0.00	**1.10**	0.05																	
Other controls																					
School participates in a pilot project, exchange program etc.						0.62	0.45	0.67	0.44	-0.19	0.79	-0.13	0.86	1.70	0.20	1.63	0.27	1.66	0.15	1.75	0.14
School size (number of pupils)	**-0.01**	0.00	0.00	0.68		**-0.01**	0.00	**-0.01**	0.00	**-0.01**	0.00	**0.00**	0.01	0.00	0.16	**-0.01**	0.02	0.00	0.08	**-0.01**	0.02
School location (1=isolated-4=city)	**3.53**	0.02	**4.98**	0.00	dummy (0=rural, 1=urban)	1.50	0.11	1.48	0.13	1.42	0.08	1.51	0.08	2.22	0.14	2.07	0.17	1.91	0.14	1.87	0.15
Class environement (e.g. disturbance, theft,etc.; 0=never-17)	0.19	0.55	0.34	0.38																	
Country fixed effects																					
Botswana	**262.66**	0.00	**338.90**	0.00	Burkina Faso	**42.54**	0.00	**43.65**	0.00	**27.03**	0.00	**28.34**	0.00	**48.79**	0.00	**48.40**	0.00	**45.02**	0.00	**45.41**	0.00
Kenya	**292.13**	0.00	**372.21**	0.00	Cameroon	**52.19**	0.00	**53.01**	0.00	**31.40**	0.00	**31.79**	0.00	**57.69**	0.00	**57.28**	0.00	**47.02**	0.00	**47.06**	0.00
Lesotho	**194.33**	0.00	**286.19**	0.00	Côte d'Ivoire	**46.08**	0.00	**47.44**	0.00	**27.77**	0.00	**28.84**	0.00	**46.81**	0.00	**46.62**	0.00	**47.21**	0.00	**40.29**	0.00
Malawi	**226.11**	0.00	**304.04**	0.00	Madagascar	**41.94**	0.00	**38.96**	0.00	**26.20**	0.00	**26.91**	0.00	**50.02**	0.00	**50.15**	0.00	**40.60**	0.00	**41.25**	0.00
Mauritius	**166.02**	0.00	**257.09**	0.00	Mali	**28.42**	0.00	**29.78**	0.00	**18.60**	0.00	**20.41**	0.00	**29.86**	0.00	**28.33**	0.00	**30.73**	0.00	**30.81**	0.00
Mozambique	**288.04**	0.00	**376.36**	0.00	Niger	**27.02**	0.00	**27.72**	0.00	**18.55**	0.00	**20.27**	0.00	**33.49**	0.00	**34.22**	0.00	**35.37**	0.00	**37.10**	0.00
Namibia	**193.70**	0.00	**276.00**	0.00	Senegal	**31.77**	0.00	**32.37**	0.00	**23.38**	0.00	**24.82**	0.00	**33.43**	0.00	**33.33**	0.00	**33.55**	0.00	**34.81**	0.00
Seychelles	**227.13**	0.00	**301.20**	0.00	Togo	**43.56**	0.00	**44.81**	0.00	**25.41**	0.00	**26.28**	0.00	**51.48**	0.00	**51.67**	0.00	**41.94**	0.00	**42.74**	0.00
South Africa	**199.21**	0.00	**290.50**	0.00																	
Swaziland	**268.12**	0.00	**361.00**	0.00																	
Tanzania	**318.80**	0.00	**401.80**	0.00																	
Uganda	**254.72**	0.00	**336.27**	0.00																	
Zambia	**206.73**	0.00	**286.71**	0.00																	
Zanzibar	**242.59**	0.00	**326.95**	0.00																	
n	37383		37383			13845		13845		13784		13784		13815		13815		13894		13894	
Specified strata (countries)			14			8		8		8		8		8		8		8		8	
Specified PSUs (schools)	2074		2074			882		882		882		882		891		891		891		891	
R-squared, between (2)	43.4%					52.3%				64.7%				31.9%				49.2%			
R-squared, within (2)	4.7%					4.5%				21.8%				3.1%				23.7%			
R-squared, total (2)	78.2%		40,7%			32.5%		32.7%		46.5%		46.7%		19.1%		19.1%		37.5%		37.6%	

(1) Exceptions: Portuguese for Mozambique, Swahili for Tanzania (mainland) and Zanzibar.

(2) Pseudo R-squared in case of Maximum likelihood estimations (Regression 1). The R-squared refers to a model with constant (omitting one country fixed effect). Note that the R-squared between schools appears very high because it includes the impact of the country dummies.

(3) Variable missing for one country and imputed using the linear regression on related variables in the cross-country sample.

coefficients significant at the 5% level are bold

Source: Fehrler, Michaelowa and Wechtler (2009)

Table A6.3: Full regressions, mathematics

SACMEQ	Regr. 11 Math grade 6 A: 2-level model		Regr. 12 Math grade 6 B: survey Regr.		PASEC	Regr. 13 Math grade 5 A: 2-level model		Regr. 14 Math grade 5 B: survey Regr.		Regr. 15 Math grade 5 A: 2-level model		Regr. 16 Math grade 5 B: survey Regr.		Regr. 17 Math grade 2 A: 2-level model		Regr. 18 Math grade 2 B: survey Regr.		Regr. 19 Math grade 2 A: 2-level model		Regr. 20 Math grade 2 B: survey Regr.	
Variable and Range	Coef.	P>|z|	Coef.	P>|t|	**Variable and Range: modifications**	Coef.	P>|z|	Coef.	P>|t|	Coef.	P>|z|	Coef.	P>|t|	Coef.	P>|z|	Coef.	P>|t|	Coef.	P>|z|	Coef.	P>|t|
Initial score at the beginning of term (pre-test score)										**0.39**	0.00	**0.42**	0.00					**0.57**	0.00	**0.48**	0.00
Learning materials																					
Pupil possesses a textbook for math						**1.08**	0.00	**1.08**	0.00	**0.71**	0.00	**0.71**	0.01	**2.11**	0.00	**1.91**	0.00	**1.12**	0.01	**1.17**	0.01
Availability of math book (0=none, 0,3=shared with several peers, 0,5=shared with one peer, 1=own book)	**5.94**	0.00	**8.43**	0.00	share of books among the pupil's class	3.09	0.08	2.91	0.11	2.50	0.08	2.07	0.21	**3.95**	0.05	3.32	0.10	**2.54**	0.16	1.98	0.26
Class is equipped with wall chart	0.80	0.65	0.55	0.80																	
Teacher has access to a teacher's manual for math	1.88	0.25	**6.74**	0.00		0.48	0.55	0.70	0.42	0.27	0.70	0.56	0.49	1.78	0.20	1.85	0.15	1.22	0.32	1.36	0.27
School equipment																					
Condition of school building (1=needs complete rebuilding - 5=good conditions)	**2.44**	0.01	**2.42**	0.01																	
School is equipped with a library	2.98	0.22	2.70	0.25		0.00	1.00	-0.20	0.87	-0.76	0.51	-1.06	0.33	1.71	0.32	2.09	0.18	-0.66	0.66	0.21	0.89
School is equipped with a first aid kit	2.77	0.27	1.83	0.52	sick-room with some equipment	2.21	0.32	2.28	0.26	2.34	0.23	2.41	0.14	3.58	0.27	3.67	0.28	2.36	0.42	3.42	0.23
School has access to water	**-4.81**	0.08	-3.03	0.27		-0.35	0.66	-0.56	0.50	-0.34	0.63	-0.51	0.39	-0.81	0.44	-0.78	0.43	0.01	0.99	-0.23	0.80
Pupil-toilet-ratio	0.00	0.67	0.00	0.75	toilets available (dummy)	-0.07	0.93	-0.26	0.75	0.23	0.73	0.13	0.88	-0.39	0.70	-0.38	0.70	-0.09	0.93	-0.14	0.87
School is equipped with electricity	**-5.84**	0.01	-4.28	0.10		0.97	0.32	1.06	0.21	0.01	0.99	0.00	1.00	1.75	0.18	1.61	0.20	-0.10	0.93	-0.01	1.00
School is equipped with technical resources: radio, tv,vcr,computer (0-4)	**13.67**	0.00	**12.90**	0.00																	
Class is equipped with library	**4.27**	0.01	4.20	0.08																	
Classroom is equipped with blackboard and chalk (or equivalen alternatives)	**6.24**	0.03	5.69	0.11		0.80	0.53	0.61	0.57	0.22	0.84	0.14	0.86	0.83	0.58	0.54	0.72	1.62	0.23	1.49	0.20
Teacher numbers and qualification																					
Class size	**3.29**	0.00	-0.01	0.98		-0.02	0.81	-0.03	0.61	0.01	0.84	-0.01	0.89	-0.05	0.46	-0.05	0.48	-0.03	0.64	-0.04	0.53
Class size squarec	**-0.03**	0.00	0.00	0.77		0.00	0.74	0.00	0.60	0.00	0.84	0.00	0.97	0.00	0.90	0.00	0.77	0.00	0.89	0.00	0.63
Teacher academic qualification (1=primary-5=tertiary)	**1.75**	0.04	**3.20**	0.01	(0=below primary - 6=at least 3 years of tertiary)	0.08	0.81	0.16	0.64	0.03	0.92	**0.12**	0.71	-0.62	0.19	-0.56	0.19	-0.61	0.15	-0.44	0.29
Teacher professional qualification (1=no teacher training 6=three years or more)	**2.37**	0.00	**1.87**	0.05	teacher has received at least some professional training (dummy)	0.80	0.45	0.78	0.43	0.48	0.60	0.56	0.53	-0.31	0.79	-0.26	0.83	0.66	0.53	0.54	0.61
Assessment of the efficacy of in-service training by teacher (1=no such training received - 5=very effective)	-0.14	0.76	-0.20	0.76	average number of in service training courses per year (during the last five years) (2)	0.85	0.07	0.94	0.09	0.59	0.15	0.62	0.14	0.90	0.09	0.94	0.11	**0.95**	0.05	1.00	**0.07**
Organization of student flows and study time																					
School organization in shifts	0.57	0.89	-2.48	0.45		**-4.49**	0.00	**-4.28**	0.00	**-2.95**	0.01	**-2.72**	0.04	**-4.06**	0.00	**-3.21**	0.01	**-3.37**	0.00	**-2.99**	0.01
Multi-grade teaching						0.45	0.77	0.19	0.92	0.91	0.50	1.02	**0.51**	-0.33	0.86	-0.34	0.85	0.45	0.78	0.37	0.85
Pupil repeats current grade (?)	**-8.66**	0.00	**-8.88**	0.00		**1.91**	0.00	**1.46**	0.00	**0.79**	0.00	0.51	**0.21**	0.32	0.46	0.50	0.38	-0.49	0.16	0.03	0.95
Pupil's overall grade repetition (1=never - 4=three or more times)	**-4.82**	0.00	**-9.32**	0.00	number of grades repeated before current grade	**-1.72**	0.00	**-2.23**	0.00	**-1.17**	0.00	**-1.47**	0.00	**-5.12**	0.00	**-5.27**	0.00	**-3.59**	0.00	**-3.81**	0.00
Pupil is never missing school	**28.15**	0.00	**24.29**	0.00																	
Pupil has no health problems	2.87	0.56	1.96	0.79																	
Teacher arrives late (1=never 3=often)	**-7.95**	0.00	**-7.04**	0.01																	
Teacher absenteeism (1=never - 3=often)	0.16	0.94	-0.43	0.83	absence in days per month (0-25)	**-0.33**	0.02	**-0.29**	0.02	**-0.24**	0.05	**-0.22**	0.04	0.25	0.08	0.25	0.09	0.10	0.43	0.13	0.30
Number of lost official school days in the previous school year	-0.06	0.69	-0.02	0.87																	
Institutional variables																					
School type (1=government, 2=privat	3.67	0.42	1.08	0.84																	
Parents' or community's contribution to class equipment of furniture, books and other materials (0=none-4)	**1.81**	0.04	**2.09**	0.02	parents easily mobilized for school issues (dummy)	1.18	0.11	1.29	0.09	0.62	0.34	0.48	0.47	0.11	0.91	0.00	1.00	1.08	**0.21**	0.69	0.39
Parents' or community's payment of exam fees, additional teacher salaries or bonuses (0=none -5)	-0.82	0.47	-0.47	0.73																	
Teacher works on a non-civil servant contract						0.59	0.61	1.33	0.30	0.24	0.81	0.61	0.60	-0.68	0.62	-0.66	0.63	0.21	**0.42**	-1.18	0.37
Teacher gets advice from principal at least once a year	0.96	0.70	-0.77	0.84	frequent exchange among teachers	0.64	0.46	0.75	0.40	0.56	0.47	0.55	0.49	-0.72	0.54	-0.90	0.43	0.63	0.55	0.36	0.72
Teacher considers promotion opportunities as very important	**-6.67**	0.00	-1.85	0.47																	
School inspection in the year 2000	-0.30	0.87	-3.49	0.18	in the year of the survey	**1.99**	0.03	**2.13**	0.02	**1.72**	0.04	**1.92**	0.02	-0.21	0.86	-0.16	0.88	-0.40	0.70	-0.29	0.76

Table A6.3 continued

Controls					Controls													
Student characteristics and family background																		
Pupil is female	**-8.48**	0.00	**-7.93**	0.00		**-1.39**	0.00	**-0.90**	0.00	**-0.68**	0.00	-0.16	0.53	**-1.69**	0.00	**-1.10**	0.01	**-0.87**	0.00	-0.58	0.12
Pupil's age in months	**-0.27**	0.00	**-0.22**	0.00	in years	**-0.40**	0.00	-0.20	0.15	**-0.40**	0.00	**-0.24**	0.04	**1.11**	0.00	**1.10**	0.00	0.03	0.86	0.11	0.60
Pupil's home possessions (e.g. newspaper, tv, fridge, etc.; 0-14)	**1.19**	0.00	**0.92**	0.00	(0-8)	**0.20**	0.00	0.16	0.05	**0.13**	0.03	0.11	0.15	**0.66**	0.00	**0.64**	0.00	**0.37**	0.00	**0.40**	0.00
Pupil' housing conditions (3=bad - 16=good)	**1.02**	0.00	**0.59**	0.02																	
Pupil's meals per day (1=none at all - 12=3x every day	**2.81**	0.00	**3.11**	0.00	(0-3)	**1.19**	0.00	**1.54**	0.00	0.18	0.41	-0.14	0.73	0.66	0.14	0.31	0.67	-0.01	0.99	-0.48	0.42
Parental education (2=none - 12=both some post-secondary)	**1.45**	0.00	**1.80**	0.00	Parental literacy (0=none - 2=both)	**0.40**	0.02	**0.67**	0.01	**0.30**	0.04	0.35	0.13								
Number of books at pupil's home (0-250)	**0.05**	0.00	**0.08**	0.00	Pupil has some books at home (2)	**1.21**	0.00	**1.68**	0.00	0.32	0.20	0.52	0.18								
Pupil speaks English at home	**22.25**	0.00	**24.02**	0.00	French (2)	**1.25**	0.00	1.07	0.07	**0.59**	0.04	0.74	0.18	**2.05**	0.00	**2.71**	0.00	**0.86**	0.07	**2.59**	0.00
Pupil gets help with homework						-0.39	0.10	**-1.00**	0.01	-0.01	0.96	-0.46	0.16	**2.96**	0.00	**2.89**	0.00	**1.30**	0.00	**1.03**	0.04
Socio economic status of classmates (1-15)	**4.88**	0.00	**4.32**	0.00	(0-8)	0.41	0.24	0.44	0.22	0.19	0.54	0.21	0.56	0.58	0.17	0.79	0.06	**0.78**	0.04	**0.91**	0.01
Teacher characteristics																					
Teacher is female	1.27	0.40	-1.49	0.51		-0.93	0.29	-0.62	0.49	**-1.45**	0.06	-1.37	0.09	1.90	0.06	1.84	0.07	**1.97**	0.03	**1.98**	0.03
Teacher job experience (in years)	**0.30**	0.00	**0.23**	0.07		0.05	0.37	0.07	0.24	0.05	0.25	0.07	0.16	-0.13	0.06	-0.11	0.08	-0.12	0.05	-0.10	0.07
Teacher speaks teaching language at home (2)						-0.48	0.37	-0.55	0.30	-0.16	0.73	-0.11	0.82	0.47	0.48	0.52	0.42	0.23	0.70	0.31	0.58
Teacher speaks local language						0.36	0.67	0.11	0.90	0.44	0.56	0.23	0.78	1.71	0.12	1.84	0.09	0.81	0.41	0.99	0.31
Pedagocial tools																					
Frequency of math test (1=none-6=once or more per week)	-0.68	0.91	-10.50	0.25																	
Squared frequency of math test	0.00	1.00	1.11	0.26																	
Frequency teacher corrects math homework (1=no homework 5=always)	**3.13**	0.00	**3.31**	0.00																	
Other controls																					
School participates in a pilot project, exchange program etc						0.44	0.60	0.60	0.48	0.66	0.38	0.55	0.46	0.44	0.69	0.33	0.79	0.33	0.74	0.42	0.67
School size (number of pupils)	**-0.01**	0.00	0.00	0.43		**-0.01**	0.00	**0.00**	0.00	**0.00**	0.00	**0.00**	0.00	0.00	0.49	0.00	0.93	0.00	0.65	0.00	0.97
School location (1=isolated-4=city)	0.99	0.53	2.68	0.10	dummy (0=rural, 1=urban)	1.22	0.21	1.20	0.22	0.98	0.26	1.03	0.25	1.33	0.28	1.26	0.30	-0.15	0.90	0.13	0.90
Class environement (e.g. disturbance, theft, etc.; 0=never 17)	0.41	0.23	0.52	0.16																	
Country fixed effects																					
Botswana	**341.48**	0.00	**422.23**	0.00	Burkina Faso	**44.54**	0.00	**41.41**	0.00	**32.06**	0.00	**30.27**	0.00	**37.77**	0.00	**37.90**	0.00	**28.06**	0.00	**30.74**	0.00
Kenya	**396.38**	0.00	**483.11**	0.00	Cameroon	**46.10**	0.00	**43.07**	0.00	**27.69**	0.00	**25.76**	0.00	**41.00**	0.00	**41.20**	0.00	**21.97**	0.00	**25.97**	0.00
Lesotho	**277.64**	0.00	**374.14**	0.00	Côte d'Ivoire	**46.37**	0.00	**31.80**	0.00	**19.36**	0.00	**17.35**	0.00	**24.68**	0.00	**25.25**	0.00	**13.78**	0.00	**16.89**	0.00
Malawi	**306.58**	0.00	**387.15**	0.00	Madagascar	**56.95**	0.00	**53.30**	0.00	**35.79**	0.00	**33.43**	0.00	**48.32**	0.00	**49.22**	0.00	**23.75**	0.00	**29.80**	0.00
Mauritius	**317.79**	0.00	**416.53**	0.00	Mali	**31.51**	0.00	**28.11**	0.00	**21.52**	0.00	**19.84**	0.00	**24.64**	0.00	**24.39**	0.00	**17.18**	0.00	**19.54**	0.00
Mozambique	**384.28**	0.00	**480.83**	0.00	Niger	**28.40**	0.00	**24.67**	0.00	**21.26**	0.00	**19.56**	0.00	**23.29**	0.00	**24.36**	0.00	**15.55**	0.00	**18.65**	0.00
Namibia	**262.78**	0.00	**352.72**	0.00	Senegal	**34.64**	0.00	**30.96**	0.00	**29.02**	0.00	**27.45**	0.00	**25.83**	0.00	**26.58**	0.00	**25.92**	0.00	**27.95**	0.00
Seychelles	**306.44**	0.00	**386.36**	0.00	Togo	**41.19**	0.00	**38.28**	0.00	**22.37**	0.00	**20.33**	0.00	**35.92**	0.00	**36.73**	0.00	**19.50**	0.00	**23.56**	0.00
South Africa	**287.46**	0.00	**385.07**	0.00																	
Swaziland	**348.13**	0.00	**437.59**	0.00																	
Tanzania	**383.03**	0.00	**471.52**	0.00																	
Uganda	**371.31**	0.00	**454.44**	0.00																	
Zambia	**289.95**	0.00	**375.09**	0.00																	
Zanzibar	**328.31**	0.00	**423.73**	0.00																	
n	36023		36023			14308		14308		14233		14233		13798		13798		13748		13748	
Specified strata (countries)			14			8		8		8		8		8		8		8		8	
Specified PSUs (schools)	2002		2002			882		882		882		882		891		891		891		891	
R-squared, between (1)	40.8%					45.5%				58.2%				37.4%				47.5%			
R-squared, within (1)	1.5%					2.8%				22.0%				2.6%				26.0%			
R-squared, total (1)	79.0%		38.5%			28.8%		28.9%		43.4%		43.5%		18.7%		18.8%		35.8%		36.3%	

(1) Pseudo R-squared in case of Maximum likelihood estimations (Regression 11). The R-squared refers to a model with constant (omitting one country fixed effect). Note that the R-squared between schools appears very high because it includes the impact of the country dummies.

(2) Variable missing for one country and imputed using the linear regression on related variables in the cross-country sample.

coefficients significant at the 5% level are bold

Source: Fehrler, Michaelowa and Wechtler (2009)

Table A6.4: Descriptive statistics of variables used in the main regressions

	SACMEQ 6th Grade				PASEC 2nd Grade			PASEC 5th Grade		
	N	mean	std dev		N	mean	std dev	N	mean	std dev
test score mathematics	41352	496.76	98.75	correct answers mathematics test (%)	14669	50.53	24.30	15418	43.91	18.19
test score literacy	41686	496.86	98.32	correct answers literacy test (%)	14689	53.28	25.27	14944	42.11	18.12
Pupil is female	41682	0.49	0.50		17046	0.48	0.50	17423	0.49	0.50
Pupil's age in months	41686	165.69	23.15	Age in years (0-8)	17046	8.08	1.29	17423	11.62	1.54
Pupil's home possessions (e.g. newspaper, tv, fridge, etc.; 0-14)	41686	5.48	3.50							
Pupil' housing conditions (3=bad - 16=good)	41686	10.44	3.25							
Pupil's meals per day (1=none at all - 12=3x every day)	41219	10.81	1.82	Meals per day (0-3)	17046	2.55	2.25	17423	2.78	2.21
Parental education (2=none - 12=both some post-secondary)	41686	6.79	2.73	Parental literacy (0=none - 2=both are literate)	17046	2.60	0.79	17423	2.53	0.84
Number of books at pupil's home (0-250)	41686	24.50	53.44	Pupil has some books at home (2)	1406	1.02	0.81	17423	1.22	0.81
Pupil speaks English at home	41686	0.77	0.42	French (2)	17046	0.22	0.41	17423	0.30	0.46
Socio economic status of classmates (1-15)	41686	6.68	2.65	(0-8)	17046	2.55	1.62	17423	2.78	1.59
School location (1=isolated-4=city)	41437	2.60	0.87	dummy (0=rural, 1=urban)	17151	0.49	0.50	17590	0.48	0.50

Annex 7: List of surveys considered in this study

Table A7: Countries by year and type of survey

PASEC	Year	Notes
2002 and earlier		
Burkina Faso	1995/6	Longitudinal, 1st wave (1st evaluation), grades 2+5
Cameroon	1995/6	1st evaluation, grades 2+5
Côte d'Ivoire	1995/6	Longitudinal, 1st wave (1st evaluation) , grades 2+5
Madagascar	1997/8	1st evaluation, grades 2+5
Mali	2001/2	Thematic (non representative), grades 2+5
Niger	2000/1	Thematic (non representative), grades 2+5
Senegal	1995-2000	Longitudinal, all waves (1st evaluation) , grades 2+5 (grade 5 in 1995+grade 5 from panel in 2000)
Togo	2000/1	Thematic (non representative), grades 2+5
2003 and later		
Cameroon	2004/5	2nd evaluation, grades 2+5
Madagascar	2004/5	2nd evaluation, grades 2+5

SACMEQ	Year	Notes
all between 2000 and 2002		
Botswana		2nd evaluation, grade 6
Kenya		2nd evaluation, grade 6
Lesotho		2nd evaluation, grade 6
Malawi		2nd evaluation, grade 6
Mauritius		2nd evaluation, grade 6
Mozambique		2nd evaluation, grade 6
Namibia		2nd evaluation, grade 6
Seychelles		2nd evaluation, grade 6
South Africa		2nd evaluation, grade 6
Swaziland		2nd evaluation, grade 6
Tanzania, main land		2nd evaluation, grade 6
Tanzania, Zanzibar		2nd evaluation, grade 6
Uganda		2nd evaluation, grade 6
Zambia		2nd evaluation, grade 6

Note: Thematic studies are non-representative. In this study, they are not used for the descriptive analysis, but only for the multivariate analysis.